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THE USE OF DRUGS IN HEART DISEASE*

BY PAUL D. WHITE, M.D., BOSTON

IN spite of the common use of drugs in heart disease there is in the minds of most physicians much uncertainty about their indications and methods of administration. I shall discuss two of these drugs in particular and several others briefly. Digitalis is so important and so often misused that it heads the list. Quinidine is so new and poorly understood that it will also be considered in detail.

DIGITALIS

To some physicians the discovery of an abnormal cardiac sign or the presence of a cardiac symptom is the occasion for the use of digitalis. Fortunately as a rule the dosage is so small that no harm is done. Rarely do such signs or symptoms require digitalis. Often there is no heart disease at all in such cases; even when there is, digitalis is useful in but a small percentage of the patients. Without doubt this drug is given too often rather than too seldom and in too small a dose rather than too large, although cases of poisoning are by no means rare.

There are three indications only for the use of digitalis: first, and most important, evident congestive failure; second, permanent auricular fibrillation or flutter where the ventricular rate is high; and third, as a therapeutic test. Evident congestive failure is present when dyspnoea, oedema or cyanosis, alone or in combination are obviously the result of myocardial weakness. There may or may not be absolute arrhythmia or auricular fibrillation. Auricular flutter or premature beats may or may not be present. Hypertension, cardiac hypertrophy, aortic regurgitation or pulsus alternans may or may not exist along with the congestive failure. None of them are contraindications. Even with heart block the presence of congestive failure demands digitalis if rest is insufficient to correct the condition. Only when there is danger of increasing the block to an alarming degree or when Stokes-Adams attacks have been occurring is digitalis contraindicated in such cases. To be sure there are certain conditions found with congestive failure that cause a difference in degree or speed of response, and some conditions which seem to counteract a favorable effect. These I shall briefly discuss.

It is in cases with auricular fibrillation or auricular flutter and rapid ventricular rate that congestive failure usually melts away with astonishing speed. The intelligent saturation of such patients with the drug has accounted not alone for the tremendous reputation of digitalis but also for that of many of the physicians using it. In fact the spectacular recoveries of patients ill with congestive heart failure and auricular fibrillation have at times resulted in extravagant statements that it is only in auricular fibrillation or auricular flutter that digitalis has virtue. This is far from the truth. There are many cases with normal rhythm who are helped very much, athough almost always less rapidly and less completely. The reason for the difference in effect is clear. Digitalis acts in several ways on the heart. In the first place it acts to depress conduction between auricles and ventricles, in other words to produce heart block. Heart block, which is already present in auricular fibrillation even when the ventricles are beating very rapidly, is easily increased, with a rapid drop in pulse rate and rest for the myocardium. In auricular fibrillation a contraction wave apparently circulates in the auricles at a rate of about 500 or 600 a minute; the ventricles follow the pace as well as they can with a very irregular response of about 120 to 150 per minute. In auricular flutter the auricles are contracting at about 300 per minute with the ventricles responding to every other contraction with a regular rate of 150. In both cases heart block is already present when digitalis is begun, and it is well known that when heart block is already present it is easily increased by digitalis. With proper saturation the ventricular rate in either condition is quickly reduced to 75 or 60 or below. This drop in pulse rate is obviously of importance. At a pulse rate of 60 the heart contracts once every second, being in systole about 1/3 of each second and in diastole about

*Read before the Section of Medicine at the annual meeting of the Massachusetts Medical Society, Boston, June, 1925.

2/3; that is, it has an eight hour day of work. At a pulse rate of 120 it must contract twice each second, and although the duration of systole decreases with increasing pulse rate nevertheless it has more hours of work each day and less of rest. If the myocardium is abnormal to start with or has to work against the strain of a stenosed mitral valve or a systemic hypertension the heart may quickly tire with increased rate. In fact the difference in pulse rate of only ten beats in such cases may mean the difference between insufficiency and sufficiency of the circulation.

Reduction of rate in normal rhythm by digitalis is not usual, at least to any pronounced degree, whether the heart is normal or abnormal. Rarely, however, in such cases a marked drop in rate does occur with improvement in condition if failure is present. A few months ago a young girl with rheumatic heart disease, mitral stenosis and congestive failure without fever showed under digitalis a drop in pulse rate with normal rhythm from 160 to 70 in two days with marked relief in symptoms. Sutherland has reported similar cases. This effect is the result of the action of digitalis on the sino-auricular node, or normal pace-maker of the heart, rather than on auriculo-ventricular conduction.

Thus two of the effects of digitalis on the heart to cause improvement in the circulation have been mentioned, both resulting in slower pulse rates—auriculo-ventricular block in auricular fibrillation and flutter, which is common, and depression of the sino-auricular nodal rate in normal rhythm, which is rare (i. e. to any important degree). We are not concerned with the problem as to how much either effect is vagal and how much is the result of direct action on the nodal and conduction tissue. The effects are the same.

The third action of digitalis on the heart is its direct stimulation of the myocardium—to increase the degree of systolic shortening of the fibers. This effect occurs whether or not the pulse is regular. It doubtless explains most of the benefit resulting to patients with congestive failure and normal rhythm in whom the pulse rate does not vary, and of course it produces its added benefit in patients with auricular fibrillation or flutter whose ventricular rate is reduced.

It has already been stated that hypertension, aortic regurgitation and pulsus alternans are not contraindications for the use of digitalis. Each of these conditions has at times been thought to be refractory to the drug or even aggravated by it. The reason is clear. As a rule all three conditions occur with normal rhythm. Auricular fibrillation may be present with hypertension or with aortic regurgitation but normal rhythm is more usual. Therefore the spectacular effect of digitalis in auricular fibrillation is not obtained in most of these cases. Simply the benefit resulting from direct myocardial stimulation is found; often this is slight and discouraging. Also it should be added that hearts with congestive failure and aortic regurgitation or pulsus alternans are generally extensively diseased or poisoned and their recuperative power is apt to be little. Nevertheless digitalis should not be withheld from these patients if they have congestive failure. Often it does some good and sometimes it helps a great deal.

There are two complications or associated conditions with congestive failure with or without auricular fibrillation that occasion as a rule a poor response to digitalis. They are fever and hyperthyroidism. In spite of the presence of fever, however, digitalis should be given if there is congestive failure—it may help. On the other hand in the presence of active hyperthyroidism there is some doubt about the wisdom of using digitalis. Plummer of Rochester, Minnesota, believes that it is contraindicated in such a condition—that it is an irritant and does more harm than good. Certainly it is true that in such cases correction of the cause of the trouble by Lugol's Solution and operation restores the circulation far better than does digitalis, probably chiefly by reducing the pulse rate and resting the overworked irritated heart.

Much detail has been considered in the discussion of the first indication for the use of digitalis—that is, the undoubted presence of congestive failure. In the course of that discussion the second indication, permanent auricular fibrillation or auricular flutter has been described and the action of digitalis in such mechanisms has been considered. Only a few points remain to be mentioned with respect to these abnormal rhythms. It was said that either abnormal rhythm is indication itself for the use of digitalis provided the ventricular rate is high, whether or not there is congestive failure. The reason for this is that a continually fast heart rate for months or years tends to tire and exhaust the heart, and since the myocardium in such cases is usually abnormal, congestive failure may eventually ensue. The evil day may be postponed a long time, in many cases probably for years, by maintaining a reduction of the pulse rate by digitalis. Nowadays some of these cases may be restored to normal rhythm by quinidine, and digitalis will thus be unnecessary. The indication for the use of quinidine I shall discuss shortly.

It should be further added that now and then patients are met who have auricular fibrillation or flutter with slow ventricular rates not resulting from digitalis but from organic heart block. The heart rate may be 50, 60 or 70. In the absence of congestive failure no digitalis is needed in such cases; they have a curious compensatory mechanism. Finally it should be mentioned that auricular flutter may be con-

verted into auricular fibrillation by digitalis and then when the drug is stopped normal rhythm may result spontaneously. If so, of course the digitalis need not be resumed, but if the flutter recurs or the fibrillation continues digitalis should be kept up if it is decided not to use quinidine sulphate. Frequently auricular fibrillation or flutter is paroxysmal. This type should be given digitalis rarely—only when the paroxysms are very long (over 24 hours) or when congestive failure is present. Ordinarily quinidine sulphate therapy is much more effective in such cases.

The third indication for the use of digitalis is as a therapeutic test. Sometimes in the absence of auricular fibrillation or flutter with a fast heart rate and in the absence of obvious signs of congestive failure one does not know whether or not to give the drug. An elderly person with some dyspnoea and weakness may be helped by it, a middle aged woman with hypertension and easy fatigue and dyspnoea may be benefitted, or a young man with marked mitral stenosis and normal rhythm may lose his heart ache under digitalis. It is often worth trying in such cases, and continuing or repeating later if it helps. It should, however, be given a fair trial and not be used coincidentally with other methods of treatment, like rest in bed, if one desires to get a clear idea of its efficacy. Also it should be used in sufficient dosage to obtain an effect, or else given to calculated saturation.

Contraindications to the use of digitalis are high grade heart block with Stokes-Adams attacks and effort syndrome. The first of these contraindications is rare, the other common. Much digitalis is wasted and many cases wrongly treated. The palpitation of effort syndrome is increased by the drug and the patient made worse. The following case illustrates the frequent misuse of digitalis in such patients. A woman of 32, very high strung and under much mental strain, went to a doctor complaining of palpitation, precordial ache and dyspnoea on excitement and exertion. She had dizzy spells and occasionally fainted. She was very sensitive to coffee. On physical examination she was obviously nervous, but without exophthalmos or enlarged thyroid gland. Her heart was normal in size and rhythm; there was a short systolic murmur at the apex; the pulse rate was 100; the blood pressure was 110 mm. mercury systolic and 70 diastolic. There was no fever. There was no oedema of lungs or extremities. The knee-jerks were equal and active. She was convalescing from a cold. Digitalis leaf in one grain pills was prescribed three times a day and taken for 5 weeks. At the end of that time she was much worse, having a forceful intermittent heart action, nausea, malaise and disturbed vision. An electrocardiogram showed partial auriculo-ventricular block, with auricular rate of 120, ventricular rate of 80, every third beat dropped, and inverted T waves in Lead II, typical of digitalis action. She was obviously suffering from digitalis poisoning. The drug was stopped and two weeks later she was much improved, the electrocardiogram being normal in every way, with a rate of 90. Reassurance and removal of some of the excitement which helped to produce her original symptoms caused further improvement.

No infectious disease of any kind, including pneumonia, lobar and bronchial, typhoid fever and endocarditis, should be treated with digitalis. Rarely congestive failure or auricular fibrillation in an old person or in a young patient with rheumatic heart trouble may complicate the infection. If it does, digitalis may be given as quickly as needed; in emergency strophanthin may even be given intravenously. But it is unwise to give as a routine in any infectious disease a drug like digitalis which is itself so easily a poison. In a state of perfect health a few years ago I took three grams of digitalis leaf in ten days and in the course of this experiment became more and more uncomfortable; finally nausea, malaise and cardiac arrhythmia resulted. I have much respect for the toxic effects of the drug and do not believe such toxic effects should be added to the toxic effects of an infection unless the heart is obviously in need of the drug. The same statement holds true for shock following surgical operations, accidents or hemorrhage. Digitalis is not of value in vasomotor collapse. It likewise has no place in routine preparations for operations or as a routine measure in surgical emergency.

Briefly now I shall discuss the methods of administration of digitalis. Experience with cases in obvious need of the drug has shown that saturation or near saturation is almost essential to obtain the best results. Small doses, which are often given far below the possibility of saturation, even in the remote future, are useless in such cases; they may go on steadily to death from congestive failure in spite of such therapy. Since the small doses are without effect in cases obviously needing the drug it is unlikely that they are of much value at any time, although it is possible that patients not requiring much therapy may obtain slight stimulation from small daily doses. This must remain an uncertainty. Saturation with digitalis has been called digitalization. It may be carried out rapidly—that is in 24 hours—or slowly—in one or two weeks. After saturation the effect may be maintained indefinitely by small doses, giving enough each day to make up for the amount excreted or destroyed daily. This is called the maintenance of digitalization. Saturation with digitalis or digitalization does not mean the production of toxic symptoms but it does mean a full therapeutic effect; if not carried out with care nausea and vomiting may

occur. The first toxic symptom of digitalis intoxication is usually anorexia; later come malaise, nausea, vomiting, prostration and sometimes interesting visual disturbances, such as yellow or green vision.

In the administration of digitalis two calculations of great importance are to be remembered. First, to saturate a person we may fairly figure that we should get into the system 0.1 gram (1½ grains) of the standardized dried leaf, or 1 cc. (15 minims) of the tincture for every ten pounds in weight of the patient. Although there are individual variations and in children about 50 per cent more can be given, this is an astonishingly accurate average. Second, the average person excretes or destroys 0.1 gram (1½ grains) of the leaf or 1 cc. (15 minims) of the tincture every day; this amount is then the maintenance dose.

By the application of these two rules it can readily be calculated whether or not a patient has been or is being digitalized; it is possible to digitalize quickly or slowly and to maintain saturation as long as desired. Of course there are frequent exceptions to these rules, depending on individual variations of patients, sometimes to be explained by rapid or poor absorption or by sensitiveness to drug action, but with care and judgment and plain common sense these exceptions can be taken care of easily. Saturation can be accomplished in 24 hours or in 7 days equally easily as a rule. In the former case the dosage is divided so that a certain percentage, say 20, 25 or 33 1/3 per cent of the total calculated dose is given at a time at corresponding 4, 6 or 8 hour intervals, the next dose being withheld until it is certain that toxic symptoms have not supervened. For such rapid digitalization the patient should be under close observation and it is better for the physician himself to see the case several times during the day, preferably just before the next dose is due. This method is sometimes indicated in urgent cases but I have usually found that saturation in 48 hours is preferable—one is less apt to produce sudden toxic symptoms in sensitive people and one obtains results almost if not exactly as good with but slight delay.

When rapid saturation with digitalis is not urgent, as in ambulatory cases or patients not very sick who may not be seen for a week, the dose is divided so that full saturation may be accomplished in one week or even in two weeks, with the warning to the patient to discontinue or to reduce the digitalis on the occurrence of toxic symptoms (anorexia, nausea, vomiting). This has been found to be a very convenient way to treat cardiac patients in dispensary clinics which meet only once a week. Also this seems to be the best method of carrying on a therapeutic test in doubtful cases.

An example of each of the two methods of digitalization is worth citing. First there is a bedridden case of congestive failure, a man weighing 150 pounds. He is quite ill and obviously needs digitalis badly, not having had any. To be saturated he should have 1.5 grams of the leaf (22½ grains) or 15 cc. of the tincture (3¾ drachms) in his system. If we desire to digitalize in 24 hours we can give him 0.4 gram or 6 grains of the leaf every 4 to 6 hours for 4 doses—this will give us 1.6 grams, which is the calculated dose of 1.5 grams+the 0.1 gram daily excreted. If we wish to digitalize him in 48 hours rather than in 24 we may give him 0.3 gram (4½ grains) of the leaf three times a day for two days, the last dose being 0.2 gram instead of 0.3 gram. This will equal 1.7 grams which is the calculated dose, 1.5 grams+ 0.2 grams which is the amount excreted in two days.

The slow method of digitalization may be carried out as follows. Again a man of 150 pounds, ambulatory, needs the drug, but not urgently. We can give him 0.1 gram (or 1½ grains) of the leaf three times a day for a week, giving 0.2 gram (3 grains) as the very first dose. This will be therefore 2.2 grams in one week, which means the calculated dose to saturate, viz. 1.5 grams+0.7 gram for the amount excreted during the week (0.1 gram daily).

It is well known that some patients, those who have auricular fibrillation or who continue to have congestive failure without digitalis, need maintenance of saturation with the drug for weeks, months and often years. This as already indicated can be secured by administration of 0.1 gram (1½ grains) of the leaf or 1 cc. (15 minims, not drops) of the tincture every day after digitalization has been produced. This can be kept up for years with benefit and no harm. Sometimes 0.1 gram is not quite the right daily ration for an individual—it may by experience be found to be too much or too little; the dose may be varied to suit, perhaps an extra pill of 1½ grains every other day, every third day or every fourth day, or even two pills daily. If one pill every day is too much it may be omitted once, twice or three times a week. Patients themselves can often tell by experience their "maintenance" daily dose.

In the past the failure of many medical men to recognize the value and sometimes the necessity of continuing digitalization resulted in many so-called "relapses of decompensation", particularly in auricular fibrillation. Ten years or more ago it was not uncommon, even in the best hospitals, to have patients with congestive failure leave the wards after courses of digitalis much improved only to return to the emergency ward or out-patient department with a recurrence of serious heart failure because the hospital doctor did not give proper instructions about the continued use of digitalis, and also because the family physiciaan did not carry out this therapy. Frequently patients appeared

almost *in extremis* with cyanosis, orthopnea and anasarca. Venesection, intravenous strophanthin and morphine would revive these people; they would recover astonishingly in the ward, only to leave with insufficient directions again about the use of digitalis. Courses were popular and when the course of a week or two was over the drug was usually stopped, even though auricular fibrillation persisted. Even at the present day these errors are made both in and out of hospitals. Moreover ten or fifteen years ago patients sometimes left the best hospitals with oedema and fast ventricular action in auricular fibrillation after treatment with digitalis because an insufficient amount had been given; digitalization was not accomplished.

The preparation of digitalis to use needs some mention. In 99% of my own cases the dried leaf in pill form has proved to be most convenient and very effective. Pills of 1½ grains, or 0.1 gram, are made up from a good fresh standardized leaf. They should be kept dry and used with assurance for 3 months, but after 6 months a new supply is needed; even after 3 months it is better to get a new lot of pills. For patients who need to be seen only once in 3 months it is very convenient after digitalization to prescribe 100 pills of 1½ grains each, to take one daily. The tincture when fresh and accurately measured is as satisfactory as the leaf in pill form, but it is not so simple to take and to carry around, and drops are always being confused with minims, even by physicians. Two drops, or a fraction over, equal one minim, but this fact is often ignored and patients may be getting only fifteen drops of the tincture instead of the fifteen minims that their physician planned to have them take. Also there is some evidence to indicate that the tincture loses its strength faster than does the dried leaf. There seems to be little or no reason for giving the infusion. It deteriorates quite rapidly and has to be freshly prepared for use. Its popularity of old was due to the fact that its dose in the pharmacopeia was relatively greater than that of either the leaf or the tincture and so it was often more effective. The dose of the tincture should be in cc. or minims ten times that of the dried leaf in grams or grains because the tincture is a 10% solution. But the dose of the infusion should be about six times (in cc. or minims) that of the tincture.

There appears to be no virtue in special proprietary preparation of digitalis over the fresh standardized whole leaf whether it be grown in America, England, Germany, Switzerland or elsewhere. At times ridiculous prices are paid for some overadvertised brand of digitalis. It is sometimes said that in rural communities where the stock digitalis may be old, shopworn and weak it is necessary to rely on one of the special brands of leaf, tincture or active principles. This should not be. The physicians of the community should insist that the pharmacist keep on hand a cheap active fresh standardized lot of digitalis or they themselves should carry some. In general now all the large reliable wholesale drug houses in America carry good digitalis; the campaign against weak preparations has had an excellent result.

In the discussion of the kind of digitalis to use mention must be made of the so-called active principles and purified extracts on the market. Cushny in his interesting new book entitled, "The Action and Uses in Medicine of Digitalis and Its Allies", published in 1925, has written as follows:

"A large number of preparations of digitalis are on the market, purporting to possess all the advantages of digitalis without its drawbacks. Thus it is claimed for some of them, that, being pure principles, the dose is uniform and the treatment is more 'scientific' than when cruder preparations are employed. But the active principles of digitalis are still so little known that no two chemists working on them are agreed as to how many are present in the plant, and it may be questioned whether any one of them has been isolated. Much less are the preparations available for therapeutic purposes to be regarded as pure substances or as incorporating the whole virtues of digitalis. This would be of less moment if these so-called digitalines, digitoxens, gitalins, and digalens were reliable in strength; unfortunately it has not yet been proved possible even for the same manufacturer working by the same method to put a uniform production on the market. And the more elaborate the method, the more do different samples of the final product seem to vary in strength. The 'pure principles' of digitalis on the market are to be regarded with distrust and to be prescribed with care."

Standardization of digitalis is carried out usually by one of two methods of biological assay, either by the frog or by the cat method. Neither one is entirely satisfactory, but either one is better than no standardization at all. A criticism of the frog method has been that the reptilian heart cannot be compared with the mammalian but it must be remembered that the method is a fairly satisfactory assay of the toxic effect of digitalis and it is known that the toxic and therapeutic actions of the drug are usually parallel. A criticism of the cat method is that introduction of the drug into the circulation is not wholly comparable to its absorption from the gastro-intestinal tract; for example preparations which show obviously decreased absorbability from the lymph sac of the frog and the gastro-intestinal tract of man may show full strength when injected into the blood stream of the cat.

Rarely is it necessary to give digitalis otherwise than by mouth. In extremely urgent cases intravenous therapy is indicated to tide over the few hours (2 or 3) before absorption

of the drug from the gastro-intestinal tract occurs sufficiently to produce a therapeutic effect. Strophanthin or ouabain in dose of ½ milligram or 1/120 of a grain may be given intravenously in such cases. One dose should suffice because digitalis given by mouth at the same time should begin in its turn to be effective within a very few hours. Larger doses of strophanthin such as 1 milligram, or 1/60 of a grain, may be dangerous, especially if digitalis has already been given. Digitalis preparations may be given intravenously instead of strophanthin, but the dosage has not been so well studied and controlled. The continuous use of digitalis or strophanthin intravenously or subcutaneously or intramuscularly in a given case should not occur. After the first dose intravenously the drug should be given by mouth. As a matter of fact among many cases of cardiac failure that I have seen during the past few years I do not recall more than a very few in which intravenous therapy was needed. The drug by mouth acted sufficiently rapidly.

One other method of digitalis administration should be mentioned, and that is by rectum. There are rare cases who can not take digitalis by mouth because of vomiting not due to digitalis, or because of inability to swallow because of mental condition. In such cases intravenous or intramuscular or subcutaneos digitalis has been usually resorted to in the past but it has been shown recently, that the drug can be given rectally in the same dosage as by mouth and with good results. Levy recommends rectal injection of aqueous solution of purified extract of digitalis leaf (1 cc. equivalent to 0.1 gram of the powdered leaf). Amounts given in one dose may range from 8 to 20 cc. He reports its use in 19 patients. This is a helpful method in the very rare cases where it is indicated.

Finally a few words are needed concerning other drugs besides digitalis belonging to the so-called digitalis group. There are a dozen or more such drugs said to possess an action like digitalis. Of these the best known are strophanthus, squill, apocynum and convallaria. There seems to be no place for these drugs in the treatment of heart disease, at least in the therapy of heart failure for which they have been particularly used, with the exception of the active principle of strophanthus, strophanthin, which has been already discussed. None of the members of the digitalis group acts consistently so well as digitalis itself. Sometimes it is said that there may be fewer toxic symptoms in the use of some of these preparations, but investigation has shown that in order to get beneficial therapeutic results there is at least as great and often greater tendency for these drugs to cause toxic symptoms. They can all be omitted from the treatment of heart failure and of auricular fibrillation and flutter.

Cactus, sometimes said to have a digitalis-like action or to act as a cardiac sedative, has been shown to be inert even in enormous dosage. Crataegus does not appear to have a digitalis-like action. Spartein does not appear to belong to the digitalis group either, but it demands further study.

Thus of all these digitalis like drugs and preparations two suffice—fresh standardized powdered whole digitalis leaf for ingestion by mouth, and strophanthin for intravenous use.

QUINIDINE SULPHATE

Unlike digitalis quinidine is an entirely new drug in cardiac therapy, although quinine had been used at times with digitalis empirically years ago in Europe. There is no doubt that the drug is a useful one, ranking next to digitalis in the treatment of heart trouble, but of course the indications for its use are very different. Very few physicians so far as I know are using it, chiefly because they are ignorant of its action or because they fear it. When it was introduced into the clinics of Europe at the end of the World War in 1918 it was known simply that in some cases of auricular fibrillation (absolute arrhythmia) it produced normal rhythm with or without clinical improvement. Early in 1921 it was introduced into the United States and for the next year or two numerous investigators studied its action in large or small groups of unselected cases. Statistics were accumulated and among them there were a few cases that did badly under the drug, a few dying apparently from embolism on the resumption of normal rhythm and a few with serious, sometimes fatal toxic effect of unknown nature. On analysis of these cases it was found that generally there could be discovered definite contraindication for the use of the drug in them. Since the completion of the preliminary studies over two years ago we have selected the cases with care, and had had no accidents at all from toxic effects or embolism until a few months ago when one of our previously successful cases, in order to restore normal rhythm after a relapse to auricular fibrillation for a few weeks, took quinidine sulphate at home in larger doses than we had advised and while working unusually hard. He died suddenly after two days of quinidine and it is not known whether his rhythm became normal or not before his death. Although we are not sure that this was a quinidine accident it indicates the need of constant care in the method of using this drug.

There are two indications for the use of quinidine—first and most important, paroxysmal auricular fibrillation, where one may prevent the paroxysms by daily rations. Since paroxysmal auricular fibrillation is at least as common as permanent auricular fibrillation and is an important cause of ill health in many old people as well as in some cases of thyroid or rheumatic heart disease and of irritability of

the heart of unknown cause, it is of great importance to know that we have in quinidine sulphate a generally effective weapon, and in this condition an entirely safe one with which to combat the arrhythmia. Most people are disturbed and made unhappy if not incapacitated by the occurrence of paroxysms of auricular fibrillation and they are extraordinarily grateful to find something, previously unknown, which may abolish altogether or at least reduce in frequency and duration these unpleasant and often crippling spells of palpitation and weakness. Sometimes if one is not sure of the diagnosis the drug is simply given for awhile as a therapeutic test and is not infrequently effective.

From two to twelve grains of quinidine sulphate in tablet form or in capsules are given as rations daily in one or in divided doses at whatever time or times of the day they prove most effective. Since most patients with this arrhythmia notice that it occurs late in the day or in the evening or at night the best time for the quinidine is in the middle or late afternoon, often in one dose of 6 grains. This daily rationing may be kept up for months or years, continuously or intermittently, as seems necessary. If after a year or so the paroxysms seem to recur in spite of it and become more frequent it may be wise in such cases to allow the fibrillation to become permanent and to keep the heart then controlled by digitalis. Digitalis however does not in any way prevent paroxysmal auricular fibrillation as does quinidine. Now and then with routine use, even with as little as 6 grains daily, a few toxic symptoms occur which are almost always negligible—looseness of the stools or a little ringing in the ears. Most patients however have no such symptoms. Very rarely is sensitiveness such that the drug cannot be taken at all, as shown by urticaria or respiratory disturbances. I have seen only one such case with the skin manifestations and none with respiratory symptoms. However it is known that rare persons are hypersensitive to quinidine (as they are to quinine) and so as a routine measure it is always wise to give a test dose of 2 or 3 grains before starting larger or regular doses.

It should be added that quinidine and digitalis may both be given at the same time effectively.

The second, less frequent indication for the use of quinidine sulphate is one type of permanent auricular fibrillation, making up about one-third or one quarter of all the cases with established fibrillation. This type is that of recent origin (within one year, and preferably within six months) in the absence of congestive failure past or present, and in the absence of serious valve lesions such as marked mitral stenosis or aortic regurgitation. In cases showing chronic auricular fibrillation, congestive failure or marked valve damage reëstablishment of normal rhythm is less likely under quinidine sulphate, relapse of auricular fibrillation is more likely and there is some danger of embolism or other accident.

In suitable selected cases of permanent auricular fibrillation the drug should be given as follows: first, the test dose of 2 or 3 grains is given; then on the next day larger doses are started, consisting of 6 grains each, at two hour intervals for 5 doses (30 grains or 2.0 grams a day); this may be continued for a week unless normal rhythm is established earlier. As a rule in the successful cases normal rhythm does occur on the first or second day. If such a course of quinidine fails it may be successful on a second or third trial, but rarely is it worth while to repeat the procedure. It often is best to digitalize the patient before starting quinidine if the apex rate is very high, but it is not necessary to do so. Even during the course of quinidine digitalis may be continued without preventing return to normal rhythm.

As in the case of digitalis while giving large doses to saturate so in quinidine it is important to see the patient each time before the next dose is due, first to determine whether or not normal rhythm has begun, and secondly to make sure that there are no important toxic symptoms or signs, such as vomiting, exhaustion or an extreme regular tachycardia. There is often, if not generally, an increase in the ventricular rate in auricular fibrillation under quinidine before resumption of normal rhythm. This should not occasion alarm.

It is wiser to have the patient in bed or at least quiet under observation during the use of quinidine sulphate in these large doses, but we have in a number of cases not found it necessary to do this, and have used the drug with success even in ambulatory cases at light work. But we have already referred to the recent experience with one of the cases who was hard at work and overdosing himself, which suggests that we cannot be too careful. Electrocardiographic control every day during the course of quinidine is very helpful, but not essential.

After the restoration of normal rhythm it probably is wisest to continue daily rations of about 6 grains for some weeks at least. Then tests can be made to see whether or not the drug may be discontinued or taken only when the patient is especially fatigued or irritable.

Quinidine sulphate has also been used and recommended in attempts to stop or to prevent auricular flutter, regular paroxysmal tachycardia, and premature beats or extrasystoles. Auricular flutter is rare and we have not enough clinical data yet to know in what percentage of cases quinidine sulphate will restore normal rhythm. It is my impression that quinidine is less successful in auricular flutter than in auricular fibrillation, but nevertheless worth using since it is effective in some

cases. Indications and contraindications for the use of the drug in auricular flutter are the same as in auricular fibrillation, and the methods of administration are similar. In paroxysmal tachycardia I have used quinidine sulphate in about forty cases with some measure of success in one third to one half, preventing attacks by daily rationing. The paroxysms are usually too short to know whether they stop spontaneously, but even in such cases I believe the drug is worth a trial in a dose of 6 grains, repeated once or twice at two hour intervals if necessary. Finally I have had little success in preventing or stopping the occurrence of premature beats, or extrasystoles, by quinidine but I have tried the drug in only a few cases. In the treatment of heart block, congestive heart failure, angina pectoris and effort syndrome quinidine has no place. Also it must not be used in the attempt to reduce the ventricular rate in auricular fibrillation except by the establishment of normal rhythm.

There has recently been published in the Boston Medical and Surgical Journal* a series of case records illustrating the indications for quinidine sulphate. To these I would refer any one desiring to learn in more detail of the help that may come by the use of the drug. Like other potent medicines, for example digitalis and morphine, quinidine may do harm if wrongly used, but it is a valuable addition to cardiac therapy and should not be withheld from patients needing it, simply because accidents in its use have been reported.

OTHER DRUGS

Having discussed in detail digitalis, other drugs of the digitalis series, and quinidine, I shall now take up briefly less important drugs used in the treatment of heart disease.

Adrenalin is a cardiac stimulant, but it is at present used only in emergency and then by subcutaneous, intravenous or intracardiac injection in doses of ¼ to 1 cc. of 1:1,000 solution of the chloride. A number of cases of cardiac standstill are now on record in which the intracardiac injection of about ½ of 1 cc. of a 1:1,000 solution has caused a resumption of cardiac contraction, especially during surgical operations or anesthesia. It is important for anesthetists and surgeons to know of this valuable aid at times of such emergency, and also it is important to know of the applicability of such therapy in cases of cardiac standstill in severe attacks of Stokes-Adams syndrome in heart block. Whether or not adrenalin will prove to be useful in the future in other dosage or method of administration in other cardiac conditions I do not know. I have not used it successfully as yet, having given it by intracardiac injection in only three cases of sudden death in heart disease, where possibly ventricular fibrillation was present to prevent its success.

To increase the ventricular rate in high grade heart block where Stokes-Adams attacks occur, and thus to prevent them, several drugs have been recommended, most prominent of which are atropin, thyroid extract and barium chloride. Atropin or belladonna has only a transient and uncertain effect after each dose, and it is necessary to give frequent repeated doses with their disagreeable desiccating effect. Thyroid extract even up to toxic effect has in a few cases prevented Stokes-Adams attacks either by lessening the degree of auriculo-ventricular block or by increasing the idioventricular rate by direct stimulation of the ventricular pacemaker. I have found it helpful. Finally barium chloride in small doses of 30 to 60 milligrams (½ to 1 grain) three or four times a day can apparently by its irritant action on the heart increase the ventricular rate in high grade heart block and so prevent Stokes-Adams attacks.

Caffein is a circulatory stimulant but probably acts more through its vasomotor effect than directly on the heart. It is helpful in conditions of shock but is of little value in cardiac failure. In my experience it has been most helpful as a respiratory stimulant in such conditions as Cheyne-Stokes respiration when given in large doses such as 5 to 20 grains subcutaneously or intravenously. Caffein is an excellent diuretic, as are also allied drugs such as *diuretin* (theobromine sodium salicylate) and *theocin* (synthetic theophylline). Other effective diuretics helpful in obstinate cardiac oedema are *calomel*, the new mercury preparation *novasurol*, and *calcium chloride*. I have used calcium chloride in doses for a few days of 12 to 20 grams daily with success in a few cases where other diuretics, even including calomel, had failed. Calcium chloride appears to act with the production of acidosis. It is rarely necessary and usually disagreeable. If digitalis, diuretin and theocin fail it is well to resort to calomel, a very vigorous diuretic. Novasurol, with a dose of ½ to 2 cc. intramuscularly once a week as needed, has been effective as a diuretic. It has but recently been introduced.

Camphor has lately been shown by Marvin and Soifer to be without effect in congestive heart failure or in auricular fibrillation, the two conditions in which digitalis has such a striking influence.

Strychnine also is apparently without effect in such conditions although it is still given as a cardiac tonic. There is already a good deal of evidence of its inertness. In what way it does act, if effective at all, we do not yet know.

There is nothing new so far as I know in the drug treatment of angina pectoris. The nitrites, particularly nitroglycerine and amyl nitrite, should be given as needed. The former I prefer, 1/100 or 1/200 of a grain dissolved

*July 16, 1925, Vol. 193, p. 91.

under the tongue. It acts almost as quickly as amyl nitrite, is cheaper, easier to carry and easier to use. Patients often hesitate to break a perle of amyl nitrite till their pain is severe and dangerous, where they do not hesitate to take nitroglycerine at the very onset of the attack. To decrease attacks of angina pectoris in frequency or duration, but chiefly in number, alcoholic drinks have been recommended and sometimes are quite useful—whiskey, brandy or even wines at intervals if attacks of heart pain are occurring very frequently in spite of absolute rest. If there is pain due to coronary thrombosis morphine alone may help, and then generally large doses are necessary. Caffein and its derivatives, especially diuretin, have been used at times in a routine way to prevent angina pectoris through their supposed production of coronary dilatation; sometimes they seem helpful.

In the drug therapy of malignant or subacute bacterial endocarditis there is no remedy at present. Mercurochrome and gentian violet are as disappointing as all the other medicines. Sodium cacodylate has also failed in my hands.

In the treatment of rheumatic fever the salicylates have a specific effect but they have a very uncertain and often disappointing action in acute and subacute rheumatic heart disease.

A drug or other measure badly needed is one that will control the mechanism producing arterial hypertension and so relieve the serious strain on heart and arteries.*

Helpful drugs in the treatment of heart disease are the sedatives, particularly bromides and morphine when indicated, and occasionally purgatives, especially the salines, but there is nothing particularly new in their use or application.

In the practice of any drug therapy one must not lose sight of the importance of other treatment. Rest and diet may accomplish more than digitalis or quinidine and the results of such measures must not be credited to drugs.

DISCUSSION

Dr. Francis W. Peabody, Boston: This is a very logical and well balanced paper on the treatment of heart disease. One of the striking points is the fact that even now, after so many years of research and study on the treatment of cardiac disease by far the greater part of such a discussion is taken up with the subject of digitalis. It is also interesting to see that in spite of the development of the new preparations of digitalis there has been no complication but rather a simplification of the forms in which digitalis is best used.

Experience has shown that one or two of the older preparations are still the most reliable preparations in the treatment of heart disease.

There has, however, been considerable advance in our knowledge of the method of administering digitalis. We have learned in the first place that the action of digitalis depends largely if not entirely on its concentration in the body, and secondly we have found out that digitalis can be given in very much larger doses than it used to be considered proper to use. An unfortunate result of the last fact is that many people are coming to think that because digitalis can be given in large doses it should always be given in large doses. Dr. White, however, has laid stress on the fact that it is rare that very large doses are necessary, and they are not always advisable in the routine treatment of heart disease.

One point in which our appreciation of digitalization dosage is of value is in the interpretation of symptoms which may be either due to digitalis or to heart disease. The most important of these is vomiting. When one has a patient with congestive failure and vomiting, it may be a difficult question to decide whether the patient has had too little or too much digitalis. One can calculate with a fair degree of accuracy the amount of digitalis that would cause digitalis intoxicaton in a given patient, so that if one knows the amount of the drug that has been given one can usually tell whether the patient is approaching the limit of his digitalis tolerance and therefore whether the vomiting is probably or possibly due to digitalis itself. If the digitalis dosage has been very small, the chances are against the digitalis having caused the vomiting, and it is important to go on and give more digitalis. In this common practical problem we are considerably aided by our knowledge of the amount of digitalis that is necessary in the individual patient to cause a therapeutic effect.

Dr. Henry A. Christian, Boston: I don't think I can add very much to what Dr. White has said and I don't think it is advisable to take the time particularly as the acoustics are very poor.

Dr. Charles A. Pratt, New Bedford: I think the Section must appreciate very deeply the two papers that have been read.

RESPONSES TO THE APPEAL OF THE BOSTON CHAMBER OF COMMERCE

Responses to the appeal for more general vaccination by the Chamber of Commerce have been most encouraging.

Business firms will be supplied with literature on application to the Committee on Public Health of the Boston Chamber of Commerce. Physicians should notify the heads of employers of labor of this opportunity to have good material for a campaign of education.

*Very recently MacDonald (Proc. Soc. Exper. Biol. and Med., 1925, Vol. 22, p. 483, and Canadian M. A. J., July, 1925, Vol. 15, p. 697) and Major (Jour. A. M. A., July 25, 1925, Vol. 85, p. 251) have reported the striking blood pressure reducing effect of liver extract in patients with hypertension. This is of great interest and much further study is needed.

THE NEW ENGLAND HEART ASSOCIATION*

BY HENRY JACKSON, M.D., BOSTON

An editorial of the Boston Medical and Surgical Journal of Nov. 1922, gives a summary of the inauguration of the various heart clinics. Just prior to The War the New York Cardiac Clinics became affiliated and the New York Association of Cardiac Clinics was formed, a later development of which was the New York Association for the Prevention and Relief of Heart Disease. The work was interrupted by The War but recently has been revived. Following the New York suggestion similar clinics were originated in Boston, Chicago and Philadelphia. An organized campaign against heart disease was started and during the winter of 1920-1921 the Boston Association of Cardiac Clinics was informally organized. The first public meeting was held at the Boston City Hospital on May 21st and during the winter of '21-'22 four public meetings were held. In November 1922 The Boston Association for the Prevention and Relief of Heart Disease was formally incorporated, and I was asked to be a member of the Board of Governors and later was honored by election as President of The Board.

The original members were all men who were especially interested in various heart problems and to this subject they gave a very large amount of time and money. In no sense was the work of these men limited to the study of heart disease as all of them held positions in the general medical wards of the hospitals with which they were connected. The study of heart disease cannot be separated from a wide knowledge of medicine in general.

At the time of the organization of the association an appeal was made to the profession and to the laity to join our association, first and foremost that their interest in this important branch of medicine might be enlisted and secondarily that they might assist our work financially as unfortunately but necessarily all such work requires money.

We felt that it was essentially wise to interest the Laity in our work as heart disease is a great problem important not only in a medical sense but as one of the factors to be dealt with in questions of industry.

Since the formation of our society we have brought to Boston many distinguished workers from other cities, Dr. Halsey of New York, Dr. St. Lawrence of New York, Dr. Wenckebach of Vienna and Dr. Abbott of Philadelphia, who presented before our association a classic on congenital disease of the heart.

Since our inauguration each winter four meetings have been held at which papers have been presented by our members, papers which have been the result not only of hard work and patient research but have entailed the expenditure of much money.

With our organization in the spring of 1923 a half time secretary was employed and in 1924 the services of a full time secretary were secured. Our expenses have been very small though the amount of work accomplished has been large. Our work is increasing, yet our funds have diminished so that we face the present year with a balance less than half what we had in 1923.

With the view of enlarging the scope of our work and secondarily of living under a name less difficult to remember the name of the association has been changed to the New England Heart Association. We earnestly hope that when the value of our work is appreciated that many more of the profession, and many more lay members may join our association. We cannot exist without at least $2,500 and a very modest estimate of the work we hope to accomplish calls for a budget of at least $6,000.

We feel that there are many reasons for the existence of an association of men especially interested in the study of diseases of the heart.

In no other branch of clinical medicine have greater advances been made than in our knowledge of diseases of the heart. Researches by use of the electrocardiograph have made clear many of the irregularities of the heart's action, have proved to us that in most cases if not in all we must give our attention to the myocardium rather than focusing our attention on the character of the valvular sounds. The older text books devoted many pages to the description of the various murmurs, with hardly mention of the all important muscular action of the heart while in the modern text book the question of the action of the valves is considered chiefly from the point of view of what such abnormality may have on the myocardium.

A great stimulus to our work and a factor of mighty import in the proper care of patients as well as an opening for intensive study is presented in the opening of wards at The Good Samaritan for the care of children and adults with heart disease. This opportunity is offered because so much work has been accomplished in the care of cases of tuberculosis in its varied forms that the wards are no longer required for the care of tuberculosis. We hope that in time as much may be accomplished in the equally important branch of heart disease.

That heart disease is a factor in our lives which must be most carefully considered and dealt with to the best of our ability we see if we look at the statistics of this disease:

Heart disease occurs in one of every hundred of our population.

Up to 45 years of age organic heart disease

*Read before the Section of Medicine of the Massachusetts Medical Society, at the annual meeting, in Boston, June 10, 1925.

causes as many deaths as typhoid or pneumonia or Bright's disease.

After 45 years of age organic heart disease causes more deaths than any other disease.

As but few cases of heart disease can be spoken of as curable we must turn our attention to the causes of heart disease, to the etiology rather than the cure; here we find rheumatism, St. Vitus Dance, high blood pressure, diseases of the arteries, syphilis.

These few suggestions point to numberless fields of work for our association. The field of work in giving counsel and help as to methods of proper living for those with heart disease is without limit.

I feel that I have in bare outline given sufficient reason for the existence of our association, with reasons why we should obtain the hearty support in personal interest and financial aid from the laity and the medical profession.

I cannot close these few remarks better than by quoting from a booklet issued by the American Heart Association in which they set forth the "Objects" of the Association:

To gather facts relating to heart disease.

To develop and apply measures which will prevent heart disease.

To coördinate the work of centres for the prevention and care of heart disease already estabished in the United States and Canada.

To encourage and assist in the development of new centres for cardiac work.

To disseminate information in regard to heart disease and the methods for its prevention and care.

To arouse the public to its responsibility and opportunity to combat heart disease.

NURSING PROBLEMS*

BY ALFRED WORCESTER, M. D., WALTHAM, MASS.

In a paper on Nursing that I read at one of our Annual Meetings long ago† I maintained that "it is the doctor's duty not only to give proper directions for the management of every patient under his charge, but also to see that his orders are intelligently obeyed."

This of course is self evident. As a consequence, which still seems to me to be inevitable, I further insisted that we are responsible for the proper training of the nurses who are to serve as our assistants and lieutenants. This I still believe, in spite of the fact that conditions in the nursing world have changed greatly during the past forty years. Only the oldest of us who remember when we had no trained nurses can appreciate this change.

Probably it will surprise most of my hearers that I can remember the discussion preceding the establishment of the first training school for nurses in this country.‡ As it so happened, its first superintendent, Dr. Susan Dimock, was a welcome visitor in our home. Twenty years earlier Florence Nightingale received her commission at Kaiserswerth, where less than twenty years before Fliedner had started the parent school of modern nursing. That was only ninety years ago.

No physician or surgeon could now be found who would belittle the enormous benefits that modern nursing has brought into the world. And yet hardly a half century ago schools for nurses were established not only without the encouragement but often in spite of the general opposition of the medical profession.

Perhaps it has been because of our early failure to help the training schools that the two professions do not always pull together as well as they should. Again it is only natural in the largely unguided development of their new profession that some nurses should fail to recognize the right relationship between the two professions. Unfortunately such nurses have too often spoken for all. And it is therefore a wonder that not worse misunderstandings have resulted. The modern feminist movement also may be somewhat accountable for a certain jealousy in the leaders of the nursing profession of anything like dictation from a profession so largely masculine as ours.

Male nurses have pretty nearly gone out of existence. That is no great loss. For nursing after all is mothering. And women because of their potential motherhood are better able to care for the helpless. By their greater staying power they save life where men could not.

The greatest benefit of modern nursing has been inside rather than outside of the hospitals. Indeed the tremendous increase in the number of them would have been impossible without the training schools. The economy of practically free nursing service is by no means the only advatage hospitals have thus received. Their whole character has been changed. Just as their sepsis has been replaced by asepsis so their morals have been redeemed. Their former degradation is now almost inconceivable. Austin Flint in speaking of the redemption of the Bellevue Hospital said that when he was an interne there it was not an uncommon experience to find nurses lying dead drunk in the wards, beside patients who had died from their neglect. Such conduct might have been expected. For the nursing staff in those years was recruited from the Police Courts where in sentencing pros-

*Read before the Massachusetts Medical Society, at its annual meeting, in Boston, June 9, 1925.

†June 8, 1887.

‡The School for Nurses at the New England Hospital for Women and Children was begun September 1, 1871.

titutes it was customary to give them the option of hospital service or a stay in jail. That was less than seventy-five years ago. But for similar frightful conditions we need not go back so far. Only twenty-two years ago the matron of the City and County Hospital in San Francisco, in her attempt to justify the filthy conditions there, complained that she had for nurses only the discarded women haunters of the saloons. In answer to my question if she could not discharge them she said "Oh yes, I always do so for flagrant immorality, such as being found asleep in bed with male patients." But, as she added, in order to retain her position she felt obliged to give such nurses their diplomas, even if they had not been in the hospital many months.

No further examples are needed of the hospital conditions before the introduction of modern nursing, nor need I remind you of the clean, wholesome conditions now prevailing. And in view of this immense improvement it may seem invidious to offer any criticism of hospital training schools. Nor would I do so were it not for my conviction that the customary methods of training might be improved. Even if it be admitted that the training now given fits to perfection the pupil nurses for hospital nursing, it certainly does not fit them for the many other equally important kinds of nursing.

Some graduate nurses, it is true, sooner or later learn to give just the service that we want for our patients in their own homes. And some after learning our own peculiar ways become invaluable assistants. Sometimes, too, when a new nurse is sent in answer to our call we find her service surprisingly satisfactory; but in such case the chances are large that she has had long enough experience in home nursing to forget hospital ways.

Now, if the nursing service of recently graduated nurses is not what we doctors want, we have only ourselves to blame for it. For very few of our profession have taken any interest or given any assistance in the training schools. Many, it is true, have given lectures in them; but such service has been of small influence in the development of the schools and in the evolution of the nursing profession. As a natural consequence, instead of a perfect mutual understanding of each other's province, and the most efficient coöperation that would be the result of it, there has arisen a sort of antagonism between the two professions. That this is an unnecessary misfortune, both for doctors and nurses and still more for our patients, is made evident by the satisfactory relationship that is soon acquired between doctors and their special nurse assistants. That effective coöperation is not more general is mainly our fault. It is because the medical profession has not made plain what kind of service is wanted, and has not taken sufficient interest in the training of our assistants.

If modern nurses have too often assumed a professional equality or rather a professional independence, it is because they have been given by us a responsibility that cannot rightly be shifted from our shoulders. The cure of our patients is certainly our business. And the *cure* depends upon the *care* of them.

The only right relationship between the two professions is that the nurse is the doctor's assistant. The highest interests of both professions, as also of our patients depend absolutely upon full recognition of this relationship.

Just as the master of the ship must know all about the work of his crew, so the doctor if he is, as he ought to be, in supreme command, must know every detail of the nursing care of his patients. If the captain sails with a green crew, it is his first duty to train them. Likewise it is the doctor's duty to train his staff of nurses—and this training must be done in fair weather, before crises arise where passengers or patients are endangered.

Pursuing this comparison still further, while the captain's job is much easier if all the crew are able bodied seamen, it is also perfectly plain that they must be ready to obey his orders instantly and implicitly. Even if they have sailed before under captains whose ways were different and in their opinion much superior, that does not excuse them for any insubordination. The safety of the ship depends upon their loyalty. The case is exactly the same where patients' lives are at stake. However preferable the methods of other doctors may be in the nurse's estimation, her duty is as plain as the sailor's. The doctor she serves under is her captain.

Theoretically this is understood by the nursing profession. But in practise modern nurses too often forget this fundamental principle. In the training schools they follow their head nurses, as of course they should, and they work also under the direction of half fledged internes. But they do not have the immediate relationship of assistants to the physicians and surgeons that would fit them for such service after their graduation. If during their pupilage they could have some outside service assigned them in the care of a single patient under the immediate oversight of the doctor, they then might have at least some chance of learning what the right relationship is between the two professions.

Besides this advantage, pupil nurses if given the whole care of a single patient in his home would have better opportunity than is ever possible in the hospital wards to learn the foundation of perfect nursing, which is the concentration of the nurse's whole atention upon all of her patient's multifarious needs. And it would be still another advantage in the nurse's education to have to work *with* the family of her patient. That is what hospital training unfits the nurse for.

How to bring about this improvement in the

training of our assistants is one of the nursing problems that now confront us. It demands our serious attention. And I believe that this Society should appoint a special committee to study the question and report to us their recommendations. It is needless to say that such a committee should ask for the coöperation of representatives of the nursing profession. There can be no doubt that the recommendations of such a committee if endorsed by the Massachusetts Medical Society, would have great weight with training school managers.

Another problem of even more pressing importance, which should receive like consideration, regards the present inadequate supply of nurses. How can families having only moderate means get the nursing service needed?

As we all know the prevailing cost of such service is higher than the average family income. And yet the average family's need of nursing service is certainly as great as the need is in families where several maids are employed.

In former years the ordinary family had at least one servant, but now only a small minority of our families have help of any kind. Moreover, it used to be the custom for neighbors to help each other in times of distress. Besides such help there used to be available in every community a somewhat uncertain number of old-time nurses, whose services many of us gratefully remember. Their weekly wages were often not more than the present daily cost of trained nursing.

In place of these earlier helpers in the homes of the sick, some of our patients of moderate means can go to the hospitals or have an hour or so of daily service from visiting nurses. But many patients either cannot get into the hospitals, perhaps because of the uninteresting nature of their chronic diseases, or they do not want to go. Some still prefer to die in their own beds. Some prefer their humble homes as the birthplace for their babies.

Great as the benefit is of a visiting nurse's daily call, and quite sufficient as is often the case, what is rather needed by many of our patients is constant nursing during the whole twenty-four hours. In families where such service cannot possibly be afforded it might be supplied by enlarging the field of the visiting nursing organizations, which might furnish day and night shifts of nurses specially employed for such service. Neighbors who no longer are either able or willing to serve as night watchers themselves might well be solicited for the support of such service. And organizations willing to undertake it surely would be able to secure adequate endowment.

Moreover, as is well known, many nurses prefer to work for organizations, where they are provided with home comforts and have regular salaries, at considerably lower rates than they can afford to work for at cases they get by chance, after perhaps long intervals of waiting. But full of economic promise as this is, it can apply only to cities and towns. And yet nurses are just as much needed in our smaller communities.

This problem of supplying the needed nursing service where under present conditions it cannot be afforded depends for its solution not only upon sufficient financial support but even more upon a larger supply of nurses.

To meet this need a proposition has been made of arranging for an inferior kind of nurses to be called by another name, to serve those who cannot afford the best kind of nursing service. This is destined to failure because it is un-American. On our deathbeds we are all paupers, and the life of the poor man's wife or baby is as precious as the magnate's. Furthermore, no self-respecting, ambitious young woman can be expected to accept permanently inferior classification, nor should she be asked to do so and much less be forced to it by legislation.

Instead of nursing castes there should be grades with every possible opportunity for women to climb up from any one of them into the higher. Every woman who has given faithful service in any one of the many branches of nursing should be given a certificate for it, and also every encouragement to try for higher certificates.

One of the causes of the present shortage of nursing service is the needless sacrifice during their pupilage of many who although unable to complete the course are nevertheless capable of valuable service. They may perhaps have broken some rule of the hospital, or failed to pass some examination, or have incurred the ill will of their official supervisor. More often their health has given way under the stress and strain of too continuous labor. Dismissal from the hospital may have been necessary, but many such girls, if only they might receive proper credit for what they have done well, could give useful service and very likely win their diplomas in other environment. Black lists are often very unfair to the women who want to be nurses.

The possibility of increasing the number of trained nurses so that the cost of their service will be materially lowered hardly needs discussion. They are not paid enough as it is. Even with present prospects most training schools have difficulty in attracting applicants. Trained nurses seldom advise their younger sisters or their nieces to enter the nursing schools. Nor can training schools longer depend upon an incoming stream of young women from other countries. It is therefore perfectly plain that the career of nursing must be made more instead of less attractive and the preparation for it easier.

There is only one way of securing the larger supply of nursing service needed by families unable to pay for graduate nurses. This is it.

Just as the hospitals depend upon pupil service so must we in our family practise depend either (1) upon those who in such service are in process of training or (2) upon those whose course of training has been interrupted.

In order to bring such plans into operation the training schools must so shape their courses that every school will take in many more pupil nurses than would satisfy its hospital.

I. In the first of the methods proposed the pupil nurses would have part of their training in home nursing, under the constant supervision of their visiting teachers and in the service of only such physicians as will accept responsibility for their training. As already has been said, in such service nurses can be better trained for the nursing needed in the homes of our patients.

This kind of training has been and still is bitterly opposed by the hospital training schools. It has been derided as the "Waltham Method," but it has a far more distinguished origin. This is the way Florence Nightingale herself was trained, and this is the way of training nurses that she advised Waltham to adopt. Of this I am able to give personal testimony.

Naturally enough those who have never seen any other method in operation cannot believe that any part of a nurse's training should be outside the wards. The superintendents of the hospital schools have believed that hospital training fits a nurse for every other kind of nursing. The graduates of these schools naturally have shared this belief, and knowing nothing of the very different requirements of home nursing they could only make hospitals of our homes; nor could they understand that this was just what we did not want.

Inasmuch, however, as this is still the general opinion of the nursing profession it is incumbent on those of us who believe otherwise to defend our heresy and to answer the objections commonly made against giving pupil nurses any home nursing service.

1. In answer to the objection that no time can be spared for such service, it may be pointed out that if the pupil nurses were transferred as they should be from the different services as fast as they become proficient in each, then not more than two-thirds of the time now required would be needed for their hospital training.

2. In answer to the objection that it is unfair to pupil nurses that their earnings in home nursing should be devoted to the support of their school, the counter question may be asked if that is more unfair than it is for the hospitals to profit as now they do from the practically free service of their pupil nurses, even when assigned to the special care of patients in the private wards.

3. Against the objection that it is not fair to subject patients in their own homes to the service of pupil nurses it may be answered that this is a question for the patients' families and doctors to decide. And it may also be pointed out that the only alternative for such patients is not graduate nurse service, which they cannot afford, but either no nursing at all or else the service of those ignorant of their own inferiority.

4. If it is objected that the lower charges for pupil nurse service is an unfair competition with the graduate nurses' charges, the sufficient answer is that in nursing professional rather than trades union standards ought to apply.

II. In the second of the methods proposed of utilizing in home service partially trained nurses, the nurses would not have such direct teaching supervision. Their service in home nursing would be an interruption rather than a regular part of their course of training. But both methods depend upon securing for the training schools a much larger number of probationers. What then can be done by the schools to attract more applicants?

The main causes for the country-wide turning away of young women from nursing seem to be:

1. Other more remunerative occupations, both immediate and prospective;
2. Dissatisfaction of graduate nurses in actual service;
3. Shorter and far pleasanter preparatory courses for other employments.

With the first two causes the schools are not especially concerned. They might, however, do more than they now do for their graduates. They might, for instance, provide and maintain Homes for them at moderate cost when they come back from their cases, perhaps sick themselves or only exhausted. They might also help them to shorter hours and to larger wages by calling sympathetic attention to the fact that nurses' charges have not increased anything like the cost of living or like the wages in other employments.

It is the third cause of the present shortage, and the possibility of making the course of training more attractive, that should receive most earnest consideration.

In the first place we must see to it that in any changes proposed there shall be no lowering of present standards. To maintain these standards it may not be possible to shorten the course of training. But may it not be possible to divide the course into separate branches, and, as the pupil nurses complete them satisfactorily, to give certificates of fitness in these different branches? With such certificates the pupil nurses could be recommended for service in whatever branches they have qualified. They could thus find remunerative employment, after say one year of preparation. And then, if they so desire, they could afterwards at any time return for additional training in other branches and for extra certificates which will give them wider fields of service and still higher remuneration.

After winning certificates in all the different branches then they might be given the diploma of the school, which would also continue to be

given to pupils who complete the regular course without interruption.

Young women who have made definite choice of a nursing career will naturally take the regular course of training. Many, however, who are not so decided, but who look forward rather to early marriages and homes of their own, or who want as soon as possible to earn money for themselves or their families in work where their hearts as well as their hands shall be employed, will be likely to prefer the shorter training offered in the special branches and the much earlier oportunities for earning good wages.

By no means all of those who would take this proposed divided training may be expected to complete the series. Some, for example, will be glad to escape the course of training in contagious nursing, even if by winning a certificate in that branch they could command higher wages. And some will prefer maternity and infant nursing, while others will avoid it. But for all who take the training and win their certificates in any branch there will always be both the chance afterwards of climbing the ladder towards a complete education with all the privileges carried by a full diploma, and also the chance of early earnings. Young women who now cannot possibly afford to take the training might by this plan easily do so. Moreover, many who hesitate to promise in their application papers to remain throughout the course, provided they are accepted as probationers, would willingly enter for one year.

The adoption of this plan by our existing training schools would obviate the necessity of creating separate schools for "attendant nurses," which at best could give only a smattering nursing education instead of a solid foundation for subsequent training. And, besides during the first year, under this plan the pupil nurses would be of great use, instead of a disturbing element, in the hospitals.

There can be no doubt of the great usefulness to the community of nurses who have had only one year of training. Their certificates would specify just what kind of nursing they are fitted for. Such nurses would be able to give a large proportion of the nursing needed. Their schools might well furnish them and the public with nursing registry service, including such extra oversight as would be advantageous and would ensure that only those who do well would be eligible for further training in other nursing specialties.

The "certified pupil nurse," whose training has been only interrupted, would be on a better footing than the "attendant nurse" whose training has been admittedly inferior. Whatever provisions might be made for the subsequent further training of "attendant nurses," it is not likely that many would avail themselves of such privileges. And we should thus have two distinct classes of nurses. This would be a great disadvantage. In every other profession we have only students and graduates. Why have any other classification among nurses?

But it is not enough to arrange shorter courses. If we want more nurses we must make the conditions of pupil nurse service more attractive. Separate chambers must be provided, so that each pupil shall have her own. Better food must be given to them by the hospitals. They must have shorter hours of service. More recreation must be provided, and parlors where the girls can receive their visitors. In short, the living conditions of the pupil nurses must be humanized.

This scheme of separate branches of nurse training is no new invention. Practically it is that of the White Cross of Holland, where it has worked well. Why not try it in this country?

The main thing to remember is that the successful employment outside of the hospitals of either pupil nurses or of those only partially trained depends almost entirely upon the active coöperation of the medical profession. Such nurses must not be given too great responsibility. They must be given explicit directions as to what is wanted of them. Their health and comfort must be assured.

The long and short of it is that our Nursing Problems can be solved only by more attention by the medical profession to the training of our assistants.

ORIGINAL ARTICLES

CLINICAL SPIROGRAPHY*

I. Pulmonary Response to Work in Normal, Obese, Cardiac and Anemic Persons

BY SEELEY G. MUDD, M.D., AND JAMES H. MEANS, M.D., BOSTON

In this paper and the two that follow are reported spirographic studies on a variety of problems. The first paper deals with the effect of muscular work, both in normal and in pathologic subjects.

*From the Medical Service of the Massachusetts General Hospital, Boston. Aided by funds from the Department of Medicine, Harvard Medical School. Awarded Boylston Medical Society Prize, 1924.

APPARATUS

The mechanism employed consisted of the Roth modification of the Benedict[1] metabolism apparatus, to which a kymograph and a timing device were attached. Figure No. 1 shows the entire machine. The record paper is supplied from a long vertical roller, *A*, of small diameter,

which is supported at the bottom by a small adjustable cone-shaped screw attached by a horizontal arm, *C*, to the side of the Benedict apparatus. The top of roller, *A*, is secured by another adjustable cone-shaped screw, *D*, which is attached to the Benedict metabolism apparatus by a second horizontal support, *E*. A small spring between the top of roller, *A*, and screw, *D*, is used to keep a suitable tension on the roller, *A*. The paper passes from roller, *A*, along the side of the metabolism apparatus, and is wound up on a second vertical roller, *B*, which is supported at the base by a universal joint connected to the kymograph. The top of roller, *B*, is secured by an adjustable cone-shaped screw which

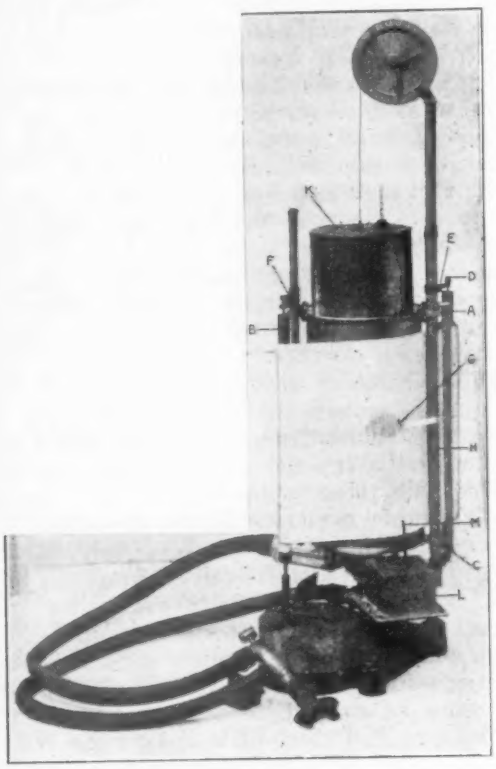


FIGURE NO. 1. Photograph of the apparatus.

is attached to the Benedict apparatus by an adjustable horizontal support, *F*. The speed of the kymograph can be varied so that the paper travels at the rate of approximately 0.2 of a cm. per second, when the fan is in place, and at a faster rate of approximately 1 cm. per second when the fan is removed. The writing point, *G*, is attached to the weight, *H*, which balances the bell, *K*. The writing point, *G*, operates in a vertical plane, the up-stroke corresponding to the inspiratory phase of the respiratory cycle, while the down-stroke indicates the expiratory phase. The writing point, *G*, is supplied with a thin ink from a small well, which forms a part of the writing point itself. A clock-work timing device, *L*, is attached to the wooden base and makes short vertical lines at intervals of 1 second. The time-recording writing point, *M*, is supplied with a small receptacle for the thin ink used.

The mouth-piece fits between the lips and teeth, and is similar to that employed in making a metabolism determination. A nose-clamp is, of course, used. The CO_2 is absorbed by a soda lime can inside the bell, *K*.

The apparatus enables one to make quantitative observations of the various phases of the respiratory cycle. It is possible readily to determine the pulmonary ventilation, volume per breath, and respiratory rate. If the high kymograph speed is employed, it is possible to record within 0.1 of a second the time relations of the expiratory and inspiratory phases. A graphic record of the vital capacity can be obtained and divided into its constituent parts, complemental and reserve air.

The computation of the respiratory records is very simple and is made in the following manner: Record No. 1 shows a respiration tracing of a normal individual, S. M. To compute his normal minute volume or total ventilation between points *A* and *B*, vertical lines are dropped to the time-recording line. The total height of all the inspirations is determined by means of a map-measuring device, which in this instance amounts to 61 11/16 inches. This factor is reduced to cms. and divided by the number of respirations within the period *A-B*. This gives the average height per respiration within this period, and in this case is 3.14 cms. The apparatus is so calibrated that 1 cm. is equivalent to 207 c.c. The volume per breath is, of course, obtained by the product of the average height of respiration in cms. and the calibration factor of the machine. In this case the volume per breath is 650 c.c. The respiratory rate is easily calculated. The minute volume or total ventilation is readily determined by the product of the volume per breath and respiratory rate, and in this case amounts to 8.65 liters. Hendry, Carpenter and Emmes[8] have shown that the average CO_2 content of the expired air is 3.45 per cent., and a correction of this amount should theoretically be added to the volume per breath because of the CO_2 absorbed by the soda lime.

The time relationship during an inspiratory and expiratory phase is determined by dropping vertical lines to the time-recording line. Vertical lines are dropped at the beginning of inspiration, at the height of the inspiratory phase, and at the end of expiration. The exact time, measured to within 0.1 of a second, can thus be estimated, and the expiration-inspiration ratio determined. The kymograph must be operated at the rapid speed, without the fan.

A vital capacity tracing of an adult male is shown in Record No. 1, (H). The mid-point in this resipratory cycle is determined, and the height in centimeters measured to the top of

the inspiration. This height multiplied by the calibration factor of the machine, namely, 207 c.c. per centimeter, gives the complemental air in c.c. To obtain the value of the reserve air, the distance in cm. is measured from the midpoint in the respiratory cycle to the bottom of the expiratory phase. This distance, multiplied by the calibration factor for the machine, gives the reserve air in c.c. In Record No. 1, (H), the complemental air is indicated from the mid position H′ in the respiratory tracing, to the top of maximum inspiration H″, and amounts to 3250 c.c. The reserve air is represented in the tracing from H′ to the bottom of maximum expiration, H‴ and in this case is 2480 c.c. The complemental air in this case is 56.8 per cent.; and the reserve air 43.2 per cent. of the vital capacity. This corresponds fairly well with the conclusions of Bohr[2], who showed that in males the average complemental air is 55 per cent., and the average reserve air is 45 per cent., of the vital capacity. In this record, the subject S.M. weighed 79.5 kilograms and was 177 cms. in height. According to the Du Bois[3] chart for determining the surface area the value in this case is 1.97 square meters. Since West[18] has indicated that the vital capacity in normal male adults is 2.5 liters per square meter of body surface, the vital capacity in this subject should theoretically be 4930 c.c. However, the tracing shows a vital capacity of 5730 c.c. or 16 per cent. above the theoretical value.

EXPERIMENTAL DATA

A number of forms of exercise were considered, among them rowing on a machine, stair-climbing, bicycle riding, and weight pulling. It was determined, however, that stair-climbing, which is a part of the routine life of the normal individual, would be the most desirable type of exercise, especially because no element of practise, as in the other exercises, would be required. Exercise No. 1 was designed to be mild enough to permit ambulatory patients, with marked organic disease, to perform the test, and was carried out in the following manner. The subject was rested in a semi-reclining position in a Morris chair for 15 minutes. At the end of this period a resting tracing was taken. The subject then walked to a staircase 20 feet away, and performed the exercise, which consisted in climbing a flight of stairs, and coming down to the starting point, two times during a period of 60 seconds. The stairs used were of 18 steps, each 7 inches high. This exercise provided for a total lift of 21 feet during the 60-second interval. After completing the exercise, a standardized interval of 30 seconds was allowed before the apparatus was started. The 60-second period on the stairs, and the 30-second time interval before the machine was started, were carefully controlled by the use of stop-watches. Respiration tracings were obtained during the recovery period. In Record No. 1 the subject, S. M., was a normal male adult, 29 years old. The interval between *A* and *B* indicates the resting respiratory tracing before exercise. At *C* Exercise No. 1 was performed as outlined previously, and the record started at *D*, 30 seconds after the completion of the exercise. The recovery period from *D* to *E* lasted approximately 4 minutes, and was divided into five periods, the first four periods consisting of ½-minute intervals, the last period of a 1-minute interval. In each of these periods the volume per breath, respiratory rate, and minute volume, were computed.

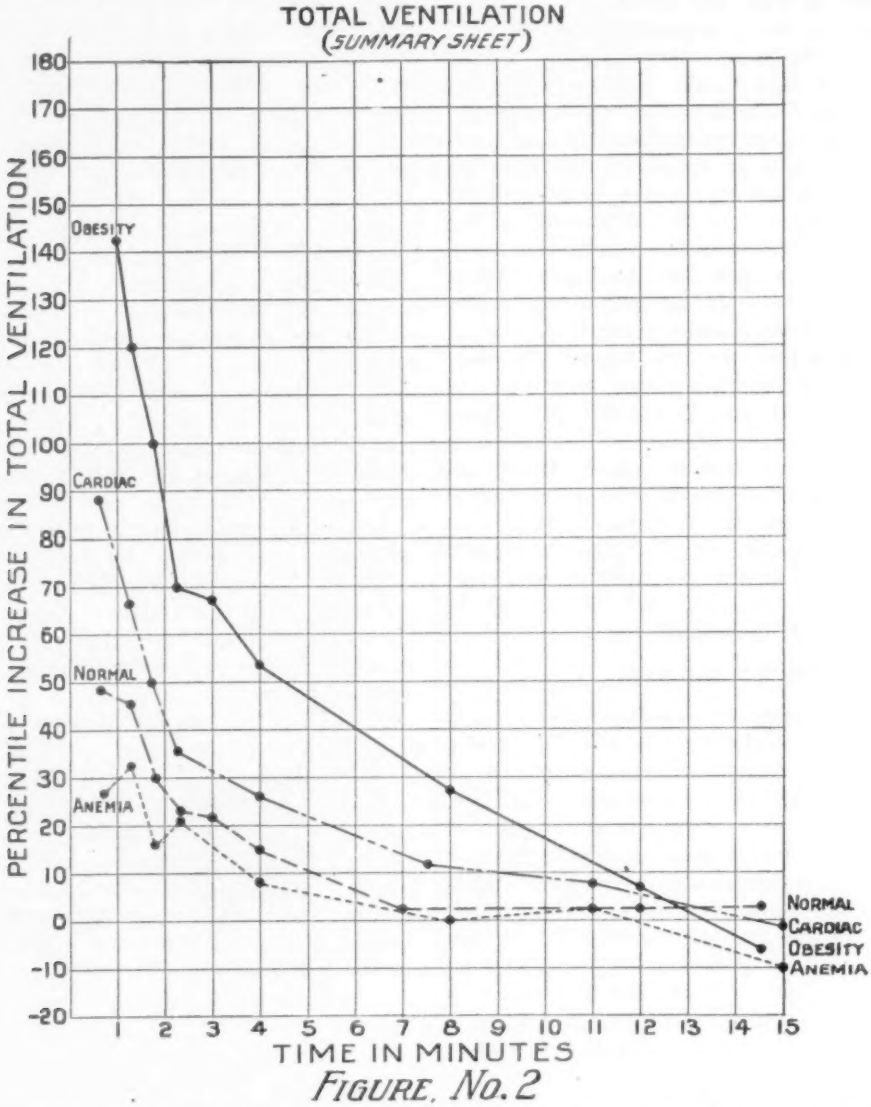
As indicated in the record the variation in total ventilation, volume per breath, and respiratory rate, during the recovery period, is expressed in per cent. of the resting values before exercise, so that, 30 seconds after the completion of the exercise, the minute volume increased 48 per cent. over the resting value, the volume per breath increased 47 per cent., while the respiratory rate showed no change. At *E* the machine was disconnected from the patient for a period of 2 minutes, so that the record from *E* to *F* comprises the time during the recovery period from the sixth to the ninth minute. During this time two determinations of volume per breath, respiratory rate and total ventilation were made. At *F* there was a 1-minute interval, so that the period from *F* to *G* comprises the tenth to twelfth minute. This record shows the reaction of a normal adult to the work experiment, and will serve as an example of this group of persons.

Record No. 2 shows the manner in which N. M. M., an adult with organic heart disease, responded to Exercise No. 1. One will observe, from the record, a resting tracing from *A* to *B;* the exercise was carried out at *B*, and the recovery period followed along from *B* to *C*, *C* to *D*, *D* to *E*. A vital capacity of 1323 c.c. is recorded at *F*, and as Peabody and Wentworth[12] have indicated in cardiac disease, the vital capacity is markedly reduced in this patient. Record No. 2 is a typical example of the manner in which the organic cardiac reacts to the mild form of exertion during Exercise No. 1.

Record No. 3 shows the respiratory response following the work experiment, of I. M., an obese individual, 34 years of age. Her weight was 110 kilograms, and her height 160 cms. The basal metabolism rate was +2 per cent. The period from *A* to *B* indicates the type of respiration at rest. Exercise No. 1 was performed at *B*, and the recovery period indicated from *B* to *C*, *C* to *D*, and *D* to *E*. At *E* the vital capacity was 1685 c.c. It will be noted in this case that the reserve air is markedly reduced. Record No. 3 shows the typical response to the work experiment of individuals falling within the obese group.

Record No. 4 indicates the manner in which an anaemic patient reacted to the test. The sub-

ject, W. J., was a man 50 years old, who had pernicious anaemia. The red blood count was 2,160,000, the hemoglobin 55 per cent. (Talquist), and the white blood count 9,200. The blood smear was typical of the disease. The respiration tracing of this individual at rest is indicated between lines *A* and *B*. Exercise No. 1 was performed at *B*, and the recovery indicated from *B* to *C*, *C* to *D*, *D* to *E*, *E* to *F*. The vital capacity was 3,260 c.c. This record will serve to illustrate the type of reaction in the group of severe anaemias.



FIGURE, No. 2

A summary showing the average percentile increase in total ventilation following Exercise No. 1, in the obese, cardiac, normal and anemic groups.

Figure No. 2 shows a summary of the results obtained in the four groups of patients studied, in respected to the increase in total ventilation following the exercise. The per cent. increase in total ventilation is expressed on the ordinates, while the time of the recovery period is plotted on the abscissa. In the investigation, a group of four obese individuals were studied, varying in weight from 90 to 110 kilograms. It will be noted that the obese group showed a greater increase in total ventilation than any of the other groups studied, the average value being 142 per cent. one minute after the exercise. It will further be observed that the increase in ventilation remains elevated for a considerable period, and returns gradually to the resting or zero value. There were twelve cardiac patients studied, with various types of organic cardiac disease, as diagnosed in the clinic or on the wards. These patients were of course all ambulatory, so that the test of stair-climbing was, in a measure, an index of their cardio-respiratory condition. The most common complaint of the cardiac patient is shortness of breath, and for this reason the average physician uses the respiratory response to exertion as a rough measure of the circulatory efficiency. It will be observed that the cardiac group showed an

increase in total ventilation of 89 per cent. at three-quarters of a minute after the exercise, and that the recovery period is shorter than in the obese group. The normal group was composed of eight adults in good health, and show an average increase in total ventilation of 48 per cent. at three-quarters of a minute after the exercise. The recovery period is much shorter than in the cardiac group. There were three patients with marked anaemia studied, and it will be observed from Figure No. 2 that the per cent. increase in total ventilation was less than the normal group, the value being 27 per cent., at three quarters of a minute after the exercise. An explanation for this phenomenon will be suggested later. It will be observed, therefore, from Figure No. 2, that the per cent. increase in total ventilation for the cardiac group was, roughly, double that of the normal group, and that the increase in total ventilation for the obese individuals was about three times that of the normal group. However, in each of the pathological groups studied there were all gradations between a markedly pathological reaction, and individuals who responded quite similarly, in most respects, to the normal. The curves shown on Figure No. 2, therefore, represent the average increase in total ventilation for the various groups, during the recovery period. Peabody and Sturgis[13] indicated in an elaborate investigation that under conditions of rest or exercise the minute-volume of respiration was much greater in cardiac patients and the breathing more rapid and shallow than in normal persons.

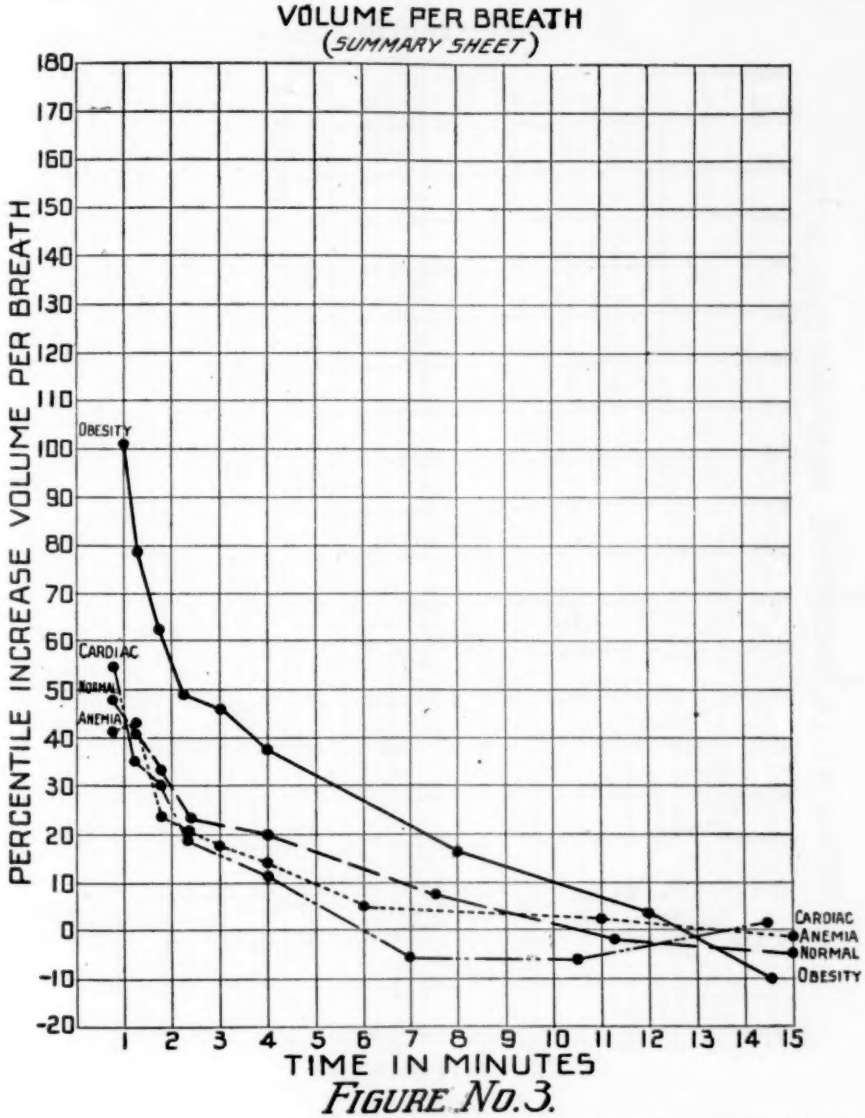


FIGURE NO. 3.

A summary showing the average percentile increase in volume per breath following Exercise No. 1, in the obese, cardiac, normal and anemic groups.

Figure No. 3 and Figure No. 4 indicate the manner in which the various groups increased their total ventilation following exercise. Figure No. 3 shows the per cent. increase in volume per breath, while Figure No. 4 indicates the per cent. increase in respiratory rate, during the

recovery period. It will be observed that the obese group increased the volume per breath 101 per cent., 1 minute after the exercise was performed, and that the per cent. increase in respiratory rate was 21 per cent. at the same time in the recovery period. The cardiac group increased the volume per breath 54 per cent. and the respiratory rate 26 per cent. at three-quarters of a minute in the recovery period. The normal individual responded to the exercise by a 48 per cent. increase in volume per breath, at three-quarters of a minute after the exercise, and it will be observed, by referring to Figure No. 4, that there was very little increase in the respiratory rate. The anaemic group showed a per cent. increase in volume per breath below the normal group, the amount being only 41 per cent. at three-quarters of a minute after the exercise. It will be observed, by referring to Figure No 4, that the anaemics had a slower respiratory rate following the exercise. The obese and cardiac group responded to the exercise by a marked increase in volume per breath, as well as respiratory rate. On the other hand, the normal individuals increased their total ventilation, following the exercise, by an increase in the volume per breath, with very little change in the respiratory rate. It will be observed that the normal and anaemic group showed less hyperpnea than the cardiac and obese individuals following the exercise, and that the normal and anaemic group responded in a more efficient manner by increasing the volume per breath and not increasing the respiratory rate. It is, of course, evident that increasing the respiratory rate, necessitates washing out the dead space a greater number of times per minute. Three of the four obese individuals studied showed

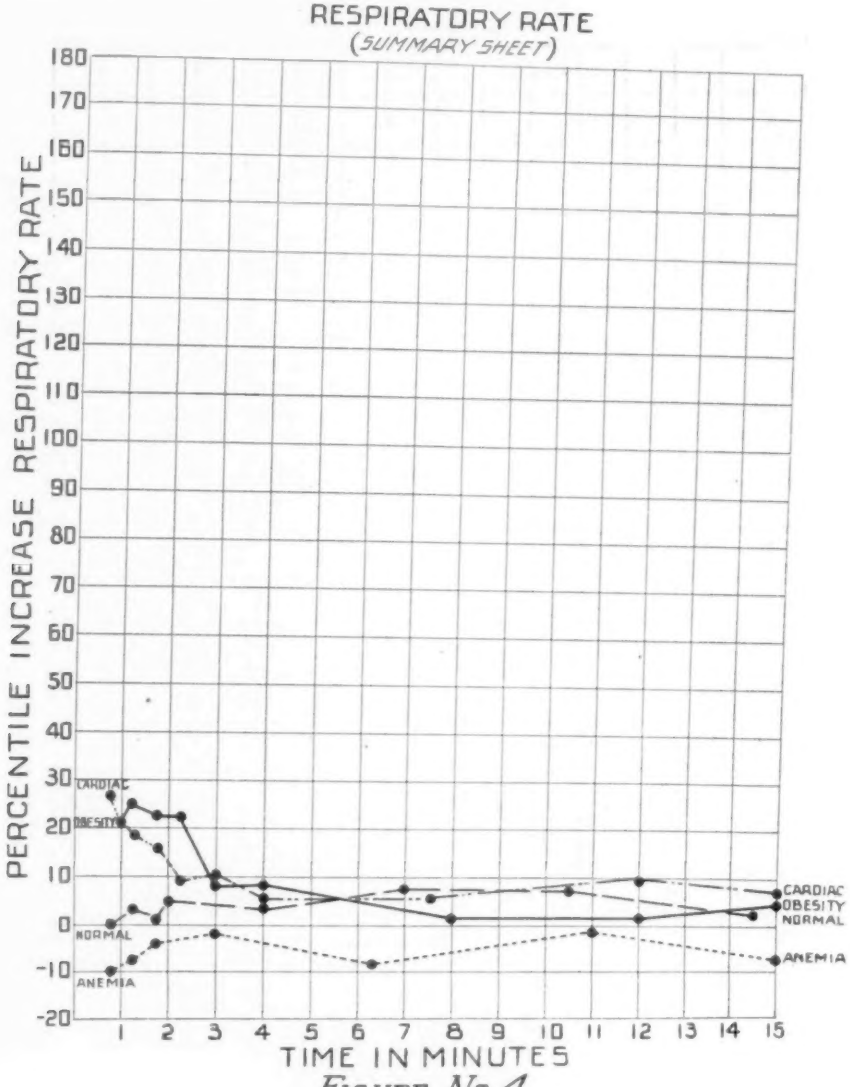


FIGURE No. 4.

A summary indicating the average percentile increase in respiratory rate following Exercise No. 1, in the obese, cardiac, normal and anemic groups.

marked shortness of breath following the exercise. Six out of eight of the cardiac individuals observed showed definite dyspnea. Of the eight normals and three anaemics studied, none were short of breath after the exercise.

Figure No. 5 shows a summary of the average pulse rates of the four groups. It will be observed that the anaemics had the highest resting pulse. However, both the anaemics and the normal group showed a vagotonic pulse reaction, following the exercise, which is most marked at 2 minutes in the recovery period. The cardiac and obese individuals both showed a slightly accelerated pulse following the exercise. It will be observed that there is a tendency for the pulse rates, in all the groups, to be accelerated at the end of the recovery period, but this phenomenon may be explained by fatigue or nervousness on the part of the patient after having been connected to the machine for 15 minutes.

The reason the anaemic group responded less to the exercise than the normal individuals is very interesting. Scott[16] showed that in two typical cases of chronic pulmonary emphysema it was possible for the patients to inspire a high percentage of carbon dioxide with a very small increase in the total ventilation. He also demonstrated that these individuals had an increase of base in the blood. It was suggested that possibly the anaemic individuals might show a somewhat similar reaction. Consequently, several re-breathing experiments were performed on normal individuals and compared with similar observations on patients with marked anaemia. Record No. 5 shows the hyperpnea produced by re-breathing CO_2, in a normal adult. Record No. 6 shows a re-breathing experiment carried out in exactly the same way on a patient with a severe secondary anaemia. The CO_2 content of the inspired air was analyzed at appropriate intervals in each record. It will be observed that the anaemic individual showed less hyper-

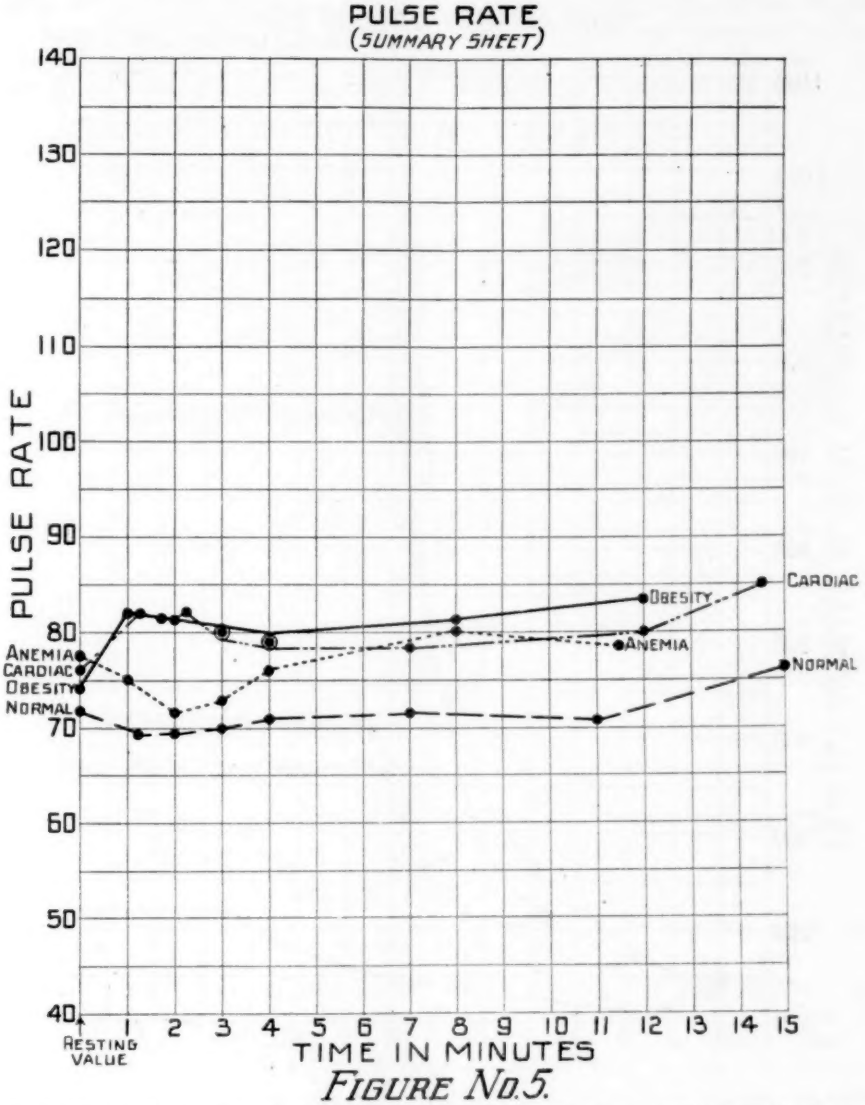


FIGURE No. 5.

A summary showing the average pulse rate following Exercise No. 1, in the obese, cardiac, normal and anemic groups.

pnea than the normal individual for the same percentage of CO_2 inspired. Figure No. 6 shows a summary of several experiments in which carbon dioxide was re-breathed. The curve SGM (90 per cent. O_2 inspired) shows the response of a normal person, and falls within Peabody's[11] zone for normal individuals inspiring carbon dioxide, with the exception of the first point, which is slightly elevated. Curve *M* shows the response of a patient with secondary anaemia, in which the red blood count was 2,000,000 and hemoglobin 40 per cent. It will be observed that the increase in total ventilation, while re-breathing CO_2, is much less marked in the anaemic as compared with the normal individual. Curve *ST* shows a similar condition in an anaemia of less marked degree, in which the red blood count was 3,000,000, and the hemoglobin 50 per cent. The lowest curve in Figure No. 6 shows the manner in which one of Scott's[16] patients with chronic pulmonary emphysema responded to an increased percentage of CO_2 in the inspired air. Scott[16] showed, however, that when the emphysematous patient inspired 11 or 12 per cent. of CO_2, a "breaking point" was reached and very marked respiratory difficulty resulted.

In order to carry out the re-breathing experiment for periods of 5 minutes or longer, it was necessary to have the apparatus filled with oxygen, and it was suggested that possibly the presence of a high concentration of oxygen in the inspired air might be responsible for the difference observed in the anaemic and normal individual. With this possibility in mind, a re-breathing experiment was performed on a normal individual, during which time the oxygen inspired was kept at 21 per cent. This curve is indicated on Figure No. 6, S. G. M. (21 per cent. O_2 inspired), and shows no essential difference be-

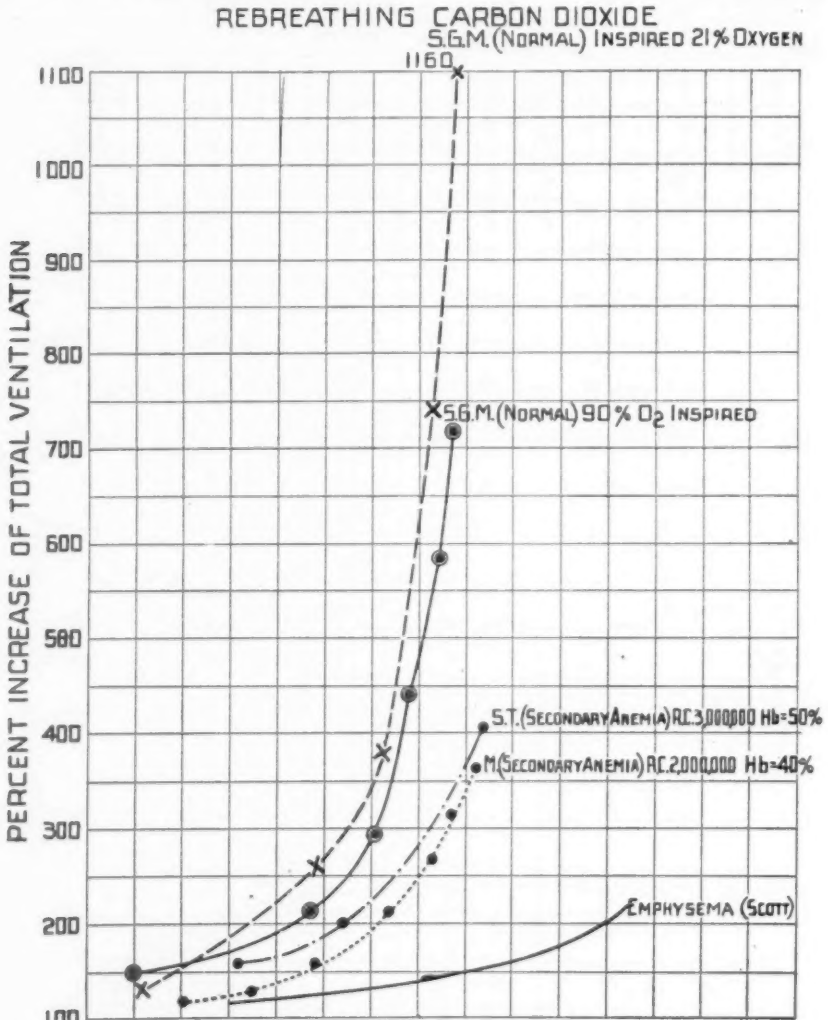


FIGURE No. 6.

A comparison of percentile increase in ventilation in a normal adult, two patients with secondary anemia, and one patient with pulmonary emphysema, produced by rebreathing carbon dioxide.

tween that of the same normal individual inspiring 90 per cent. oxygen.

Figure No. 7 shows several carbon dioxide dissociation curves. The normal dissociation curve for whole blood is shown, as well as the carbon dioxide dissociation curve for normal plasma. It will be observed that the carbon dioxide dissociation curves in anaemia are higher than the normal curve for whole blood, and that the greater the degree of anaemia, the more nearly the anaemia curve approaches the normal plasma. The raised dissociation curves in the anaemia indicate an increase of base in the blood.

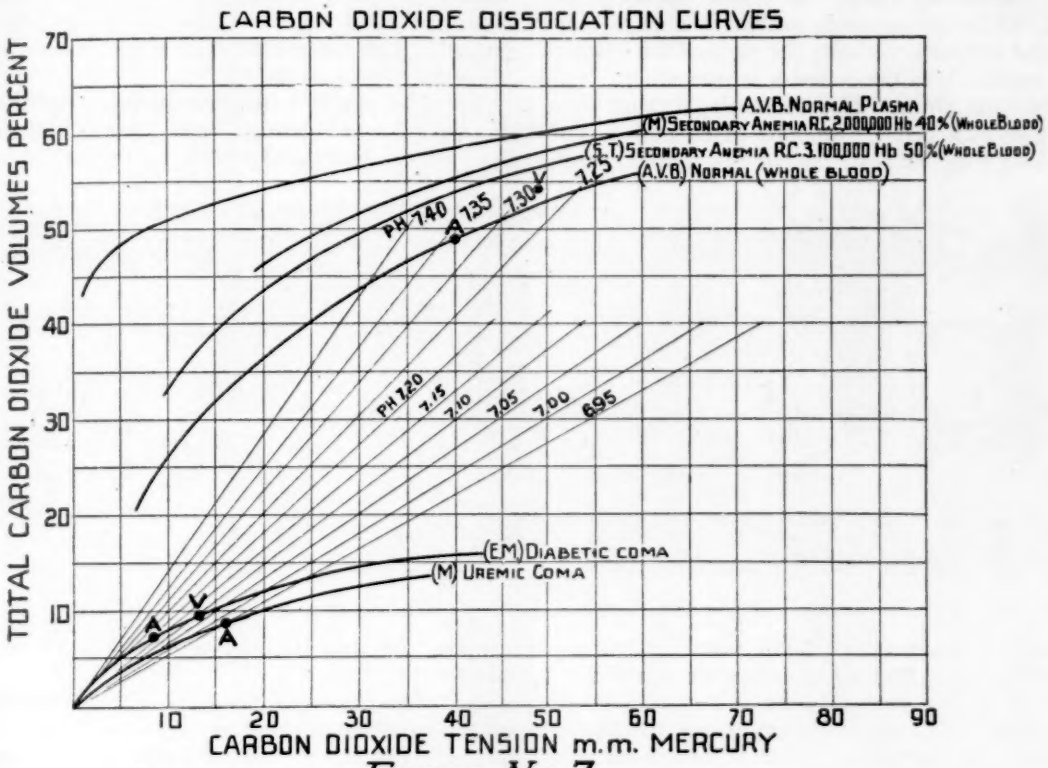


FIGURE No. 7.

Carbon dioxide dissociation curves for normal whole blood, for normal plasma, for whole blood in two cases of secondary anemia, for a patient in diabetic coma and for an individual in uremic coma.

Means, Bock and Woodwell[10] have reported still higher dissociation curves in pernicious anaemia. Scott[16] found a high bicarbonate content of the blood in pulmonary emphysema. Of course, it is evident that the pulmonary changes in emphysema are very different from the hemoglobin deficiency in anaemia, but both types of cases react in the same general manner.

With a high venous CO_2 in anaemia, without marked changes in pH, there is associated with the high carbonic acid content a corresponding increase in sodium bicarbonate so that the ratio of carbonic acid to sodium bicarbonate will remain at approximately a normal level, and hence the H-ion concentration will show little variation.

Scott[16] suggested that the sluggish response to CO_2 in emphysema might be due to two possibilities: First, an increased capacity for storage of CO_2 in the body fluids, and second, a change in the sensitivity of the respiratory center. It is conceivable that the functional activity of the respiratory center might be depressed due to changes based on a process of adaption. On the other hand, the increase of base in anaemia, indicates that the subject can bind more CO_2 than normal, and consequently a higher per cent. of CO_2 can be inspired before a change in the H-ion concentration occurs, which is sufficient to stimulate the respiratory center.

Fridericia[4] confirmed the work of Zuntz and Grüber by showing that as the CO_2 tension of the blood is elevated, the carbon dioxide combining power of the plasma and red cells is also raised. His results also indicate that carbon dioxide displaces anions, especially chloride ions from the plasma into the corpuscles. Coincidently, an equivalent amount of hydroxyl ions pass from the corpuscles to the plasma. This exchange turns a part of the sodium chloride of the plasma into NaOH, which combines with some of the free CO_2 to form bicarbonate.

Scott[15] showed that the blood bicarbonate was elevated in cats inspiring various concentrations of CO_2. Henderson and Haggard[7] confirmed this observation. Four theoretical alterations in the normal free and combined CO_2 in the blood were suggested by Haggard and Henderson[5]. One of these alterations may occur in

anaemia with elevation of both the free and combined CO_2. The tissue bicarbonate may vary considerably, therefore, while the H-ion concentration remains approximately normal.

While the reaction of the anaemic patient to very mild exertion, as in Exercise No. 1, produces less increase in total ventilation than the normal, it does not follow that this same condition will prevail during a more strenuous exercise. It is possible that the anaemic individual might develop a very distressing dyspnea, following a period of marked exertion, and show a condition corresponding to the "breaking point" noted by Scott[16] in emphysematous patients. While the anaemic patient is able to carry out mild exercise without the normal increase in total ventilation, the process is one which leads to a vicious circle. For example, during exercise there is a greater amount of carbon dioxide produced than at rest, but in the anaemic individual this does not call forth the usual respiratory response. During exercise the metabolism is increased and more oxygen is required by the individual. The normal respiratory mechanism increases the pulmonary ventilation during exercise, and in the recovery period, thus increasing the amount of oxygen inspired and maintaining the alveolar carbon dioxide tension practically constant. The reduced respiratory response during exercise, and in the recovery period, tends to produce more marked anoxemia in the anaemic, who is already suffering from oxygen want, because of the decreased amount of hemoglobin in the blood.

In order to determine whether or not the reaction of the obese individuals was due to the increased amount of work performed in lifting a greater weight, a series of experiments were conducted, in which a normal adult carried weights of 20, 40, and 60 kilograms, and executed Exercise No. 1. Even though this weight was added immediately, without the possibility of the individual adjusting himself to the increased load, the pulmonary ventilation, in any case, was not as high as in an obese individual of equivalent weight. This indicated that the high pulmonary ventilation of the obese individuals, following exercise, was not dependent alone upon increased weight. Although there is no proof, it is suggested that in markedly obese individuals there may be a mild degree of cardiac insufficiency dependent upon diminished cardiac reserve.

CONCLUSIONS

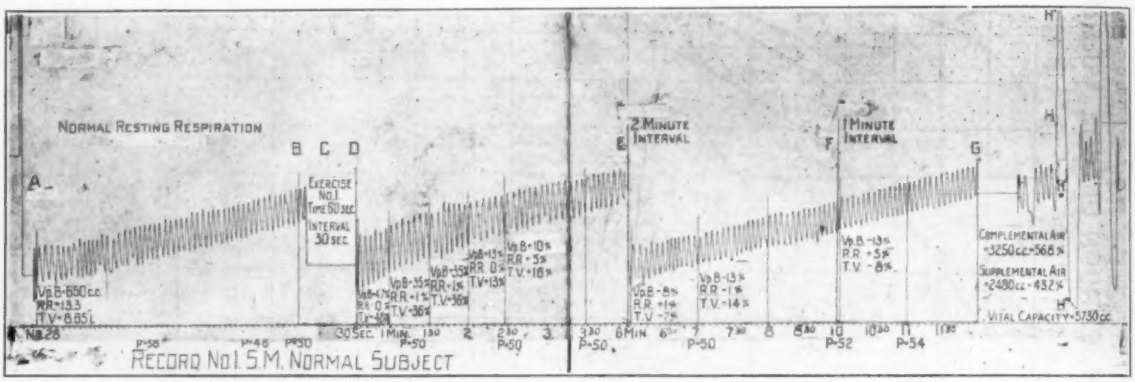
(1) The obese group showed the most marked increase in total ventilation following the standardized exercise. This increase in total ventilation was produced by a marked increase in the volume per breath and respiratory rate. Dyspnea prevailed in three of the four patients studied. The pulse showed a slight acceleration following the exercise.

(2) The marked increase in total ventilation of the obese group was not dependent alone on the increased weight of the individuals, but may be due in part to diminished cardiac reserve.

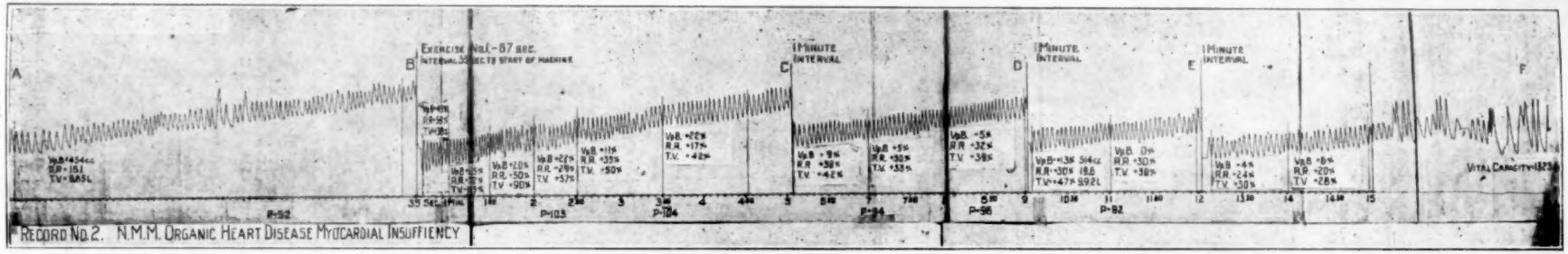
(3) The group of patients with compensated cardiac disease showed an increase in total ventilation following the standardized exercise, which was approximately two-thirds as marked as in the obese group. The increase in total ventilation was produced by an increase in the volume per breath, as well as an increase in respiratory rate. Dyspnea prevailed in eight of the ten individuals studied. The pulse showed a slight increase following the exercise.

(4) The normal individuals observed, showed an increase in total ventilation following the standardized exercise, which was approximately one-third as marked as in the obese group, and nearly one-half as pronounced as in the cardiac group. The increase in total ventilation was produced almost entirely by an increase in volume per breath, and not by a marked increase in respiratory rate. None of the eight persons studied were dyspneic. The pulse showed a vagotonic response.

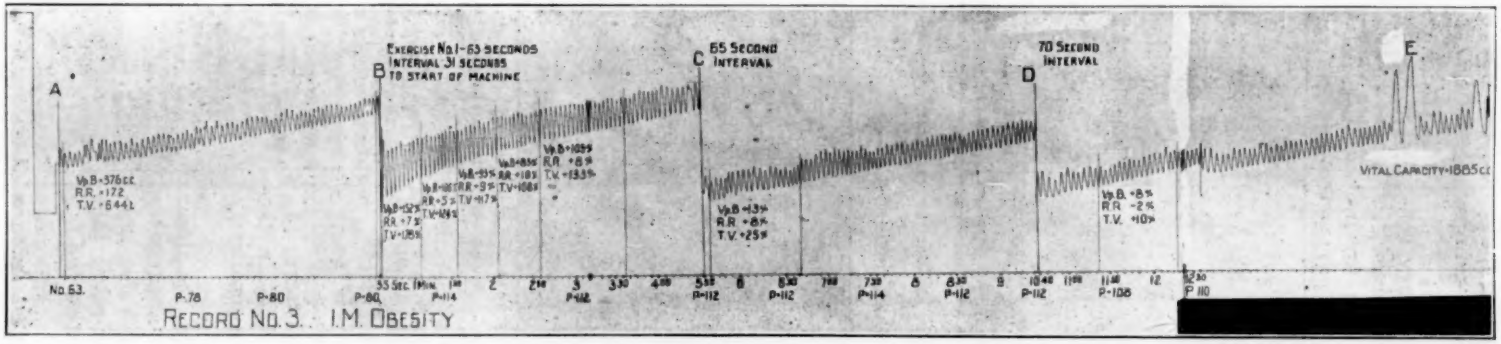
(5) The anaemic group showed an increase in pulmonary ventilation less than the normal group. This reduced increase in total ventila-



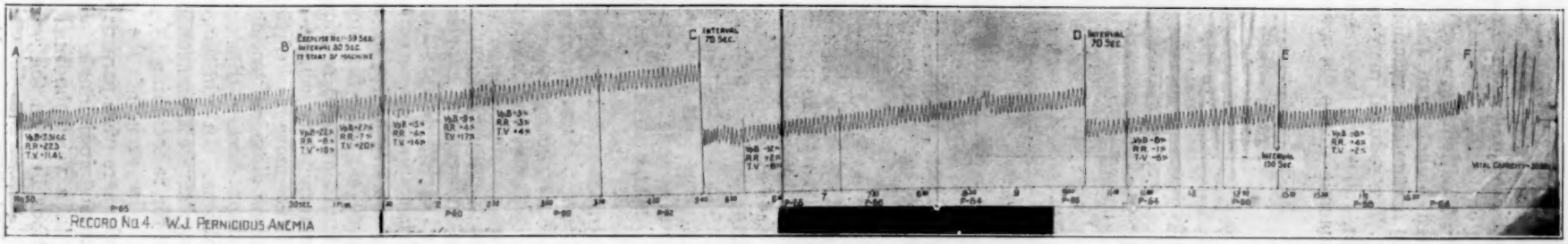
RECORD NO. 1. A respiratory tracing showing the manner in which a normal adult responded to Exercise No. 1.



RECORD NO. 2. A respiratory tracing indicating the way in which an adult with organic heart disease responded to Exercise No. 1.



RECORD NO. 3. A respiratory tracing showing the response of an obese individual to Exercise No. 1.



RECORD NO. 4. A respiratory tracing indicating the manner in which an anemic patient responded to Exercise No. 1.

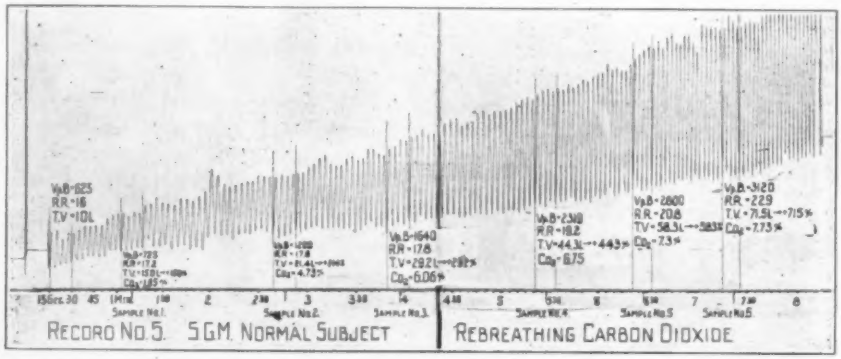
tion was produced by an increase in volume per breath, associated with an actual reduction in respiratory rate. Dyspnea was not present in the three patients studied. The resting pulse, although higher than the other three groups, showed a vagotonic reaction.

(6) The reduced increase in pulmonary ventilation, following the standardized exercise, in the anaemic group, is associated with an increased tolerance for carbon dioxide, as shown by the re-breathing experiments, as well as by a raised carbon dioxide dissociation curve. The sluggish respiratory response to carbon dioxide in anaemia may be due to two possibilities: (a) Increased capacity for storage of CO_2 in the body fluids, and (b) a change in the sensitivity of the respiratory center.

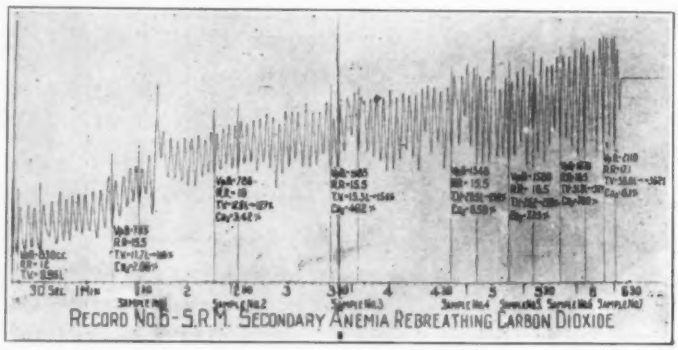
(7) The more marked the anaemia, the closer the carbon dioxide dissociation curve approaches the carbon dioxide dissociation curve for normal plasma. In addition, it is indicated that the more severe the anaemia the greater the tolerance for re-breathing CO_2.

(8) In each of the pathological groups studied, there were persons who responded quite like normal individuals, other persons who reacted in a very abnormal manner, as well as variations between these two.

In this investigation we desire to thank Dr. Paul Starr, Dr. A. V. Bock, Dr. F. T. Hunter and Dr. Edward Gildae for their suggestions and assistance.



RECORD NO. 5. A tracing showing the respiratory response of a normal subject while rebreathing carbon dioxide.



RECORD NO. 6. A respiratory tracing showing the way an individual with secondary anemia increased his ventilation while rebreathing carbon dioxide.

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MEDICAL PROGRESS

PROGRESS IN SYPHILIS—1924

BY AUSTIN W. CHEEVER, M.D., BOSTON

A study of the literature on syphilis for the year 1924 shows no startling advances, but many articles of sound value have appeared. Bismuth, the malarial treatment of neurosyphilis, and tryparsamide are finding their rightful places in treatment.

RACIAL

Bartholomew, R. A. (*J. A. M. A.* 83:172, July 19, 1924) found that negro syphilitic patients have three times as many abortions and seventeen times as many stillbirths as non-syphilitics. Treatment of this group during pregnancy led to a decided reduction in this number. A dark field examination of a suspension of liver substance obtained at necropsy or by aspiration is recommended as a valuable aid in diagnosing syphilis in babies stillborn or dying shortly after birth.

EXPERIMENTAL

Brown, W. H., and Pearce, L. (*Jour. of Exper. Med.* 39:645, May 1924) have shown that in rabits treponemata can permeate the unbroken mucous membrane, such as the conjunctiva or the prepuce. Lesions at the point of entrance may not occur, or may be so slight as not to be detected. These experiments have a bearing on the problem of the obscure atypical cases in the human.

Klauder, J. V. (*Arch. of Derm. and Syph.* 9:446, April 1924) conducted experiments *in vivo* involving attempts to produce arsenic-fast strains of treponemata. The general plan was to allow the treponemata to accustom themselves gradually to the action of arsenic by injecting into rabbits with active syphilitic lesions, a very small dose of arsphenamine; after a variable period to transplant the organism from animals thus treated to other animals, treating the latter with a slightly larger dose of the drug, and repeating this procedure until the amount of the drug was reached which constitutes the therapeutic active dose and that amount of arsphenamine constituting the curative dose in animals not so treated. By this method the resistance to arsenicals in certain strains of treponemata was increased within certain limits.

Klauder, J. V. (*Arch. of Derm. and Syph.* 9:219, Feb. 1924) has previously reported in great detail his studies on the spirocheticidal activity of bismuth in rabbit and human syphilis. He now reports studies on some other metals: uranium acetate, barium chloride, germanium oxide and platinum chloride showed no spirocheticidal activity and were very toxic. Gold and thorium have such activity and he suggests that the combination of those metals with the arsenical group of drugs may enhance the spirocheticidal properties of the latter, as the action of antimony is known to be increased by such a combination, known as luargol. Available salts of vanadium were too toxic to study their spirocheticidal value.

Brown, W. H. and Pearce, L. (*Ann. of Clin. Med.* 3:1, July 1924) contribute a very interesting and important review of the problem of therapeutics in syphilis, as it relates to experimental procedures. They emphasize that one must know all the aspects of syphilis, clinical, biological, and pathological: that one must understand the behavior of the therapeutic agents, and human physiology, for it is not the parasite or the disease that is being treated, but the patient. Therapeutic agents fall into three groups; the group of specific parasiticidal agents, the group containing mercury and the iodides, the nature of whose action is not entirely clear; the group of non-specific substances and procedures, some of proved usefulness, others somewhat doubtful, among the latter hydrotherapy, radiant energy, protein injections, the use of vaccines or induced infections, and various endocrine products. In very early cases the spirocheticidal activity of the drug is of foremost importance, for in general the organisms are in exposed positions and can be readily destroyed; although some are not accessible even in the earliest cases. Hence the choice of agents must depend on the other qualities such as penetrability or the ability to cause resolutions of the lesions as a means of exposing protected organisms. There are many substances of high spirocheticidal activity which are useful when the organisms are in the blood stream, while other with lower parasiticidal activity may prove more effective because of their ability to reach hidden foci. In advanced stages of either acquired or congenital cases

treatment is more complicated. The organisms are established in such inaccessible locations as the circulatory and nervous systems, and the health of the patient has perhaps suffered. Complete sterilization is now impossible, and efforts must be so directed as to insure control of the infection and preservation of health of the patient. As no drug is equally effective for all these purposes several drugs have been used. "Mixed" therapy is definitely indicated in late cases.

Until recently experimental investigations have been along the line of estimating the therapeutic value of drugs only from the parasiticidal activity. It is obvious that if parasiticidal agents, begun in the early stages and systematically continued, fail to accomplish the desired results, there is less chance of success as time goes on and the obstacles are greater. It is obvious that the entire system of treatment should be replanned in such cases, especially considering the patient rather than the disease alone. All therapeutic agents which cause an abrupt cessation of the reaction on the part of the patient yet fail to destroy the organism are disadvantageous and predispose to late recurrences. The earlier treatment is undertaken the more serious are the consequences of failure because of the interference with the immunological reactions. The later treatment is begun, the greater and more stable is the patient's resistance.

Mercury and iodide seem to react on the patient rather than on the organism. Mercury has a feeble spirocheticidal action, the iodides none. In animals, age, sex, and breed exercise a very potent influence in the course of syphilis. Facts such as these clearly indicate that the ability to combat syphilis is an inherent constitutional trait, but may be changed with age, physical condition and in response to certain external influences such as climate or weather. Lastly, it has been found that alterations in the anatomical and physiological state, especially of the endocrine and lymphoid mechanism in animals cause marked changes in their response to syphilitic infection.

PRIMARY SYPHILIS

Elliot, J. A. and Todd, L. C. (*Arch. of Derm. and Syph.* 9:208, Feb. 1924) describe the use of the Kahn test on serum obtained directly from the chancre. This is positive on serum from the local lesion much earlier than in the blood by either the Kahn or the Wassermann test. It should be in no way used as a substitute for the dark field examination, but is of special value when the latter is negative particularly after mercurials have been used. Klauder previously called attention to the "local" Wassermann.

REINFECTION

Driver, J. R. (*J. A. M. A.* 83:1728, Nov. 29, 1924) recalls that Brown and Pearce were able to produce superinfection in rabbits when they were reinoculated while still in the primary stage, untreated or following a subcurative dose of arsphenamine, while in similar cases where the animals had received intensive treatment superinfection could not be produced. For the diagnosis of syphilitic reinfection he gives the following criteria: in the first attack, recovery of the treponemata from the lesion or by lymph node puncture; in the second attack, recovery of the organisms from the new chancre which appeared at a different site from the first, the blood at the same time giving a negative Wassermann reaction. The writer reports thirteen cases from the records of about 5,000 cases of syphilis; in ten, all conditions above outlined were fulfilled: the other three cases were probably reinfections, but one of the requirements was lacking. All of the cases had received from six to twenty-four injections of arsphenamine, and from fifteen to fifty injections of insoluble mercury. The periods between invasions varied from one to one hundred and twenty months, with an average of fifteen. The author believes that this indicates that the first infection confers no immunity. He believes that a person can be reinfected as soon as he is free from the first infection.

EARLY SYPHILIS

Irvine, H. G. (*Arch. of Derm. and Syph.* 9:231, Feb. 1924) urges that every patient should be completely examined and his condition positively diagnosed before treatment is undertaken. Abortive treatment should be undertaken only in carefully selected cases and even then two or three courses of both mercury and arsphenamine should be given. Methods of treatment are now pretty well settled as to minimum requirements, but this treatment should extend in all cases over a two or three year period, regardless of favorable serologic findings, and should include the arsenical drugs and either injections or inunctions of mercury. Our problem is to convince the patient of the need of this extended treatment. There should be a period of at least two or three years of observation after treatment, and occasional relapses indicate that this may well be even further extended.

ADDISON'S DISEASE DUE TO SYPHILIS

Oro, A. (*Riforma Med.* 40:890, September 1924) reports three cases of typical Addison's disease following syphilitic involvement of the suprarenal glands. Two patients were greatly improved by specific treatment while the third entered the hospital in an advanced asthenic condition and died shortly afterward. Post mortem examination showed syphilis of the suprarenal glands.

PERITONITIS

Mascherone, H. and Tourreilles, J. F. (*Semana Med.* 1:393, Feb. 1924) describe a

case of syphilitic peritonitis in a woman of 43 who had ascites and sclerosis of the liver. The peritonitis had been supposed to be due to tuberculosis, but the Wassermann was positive, and under treatment for syphilis the ascites disappeared and the general condition improved. Following neglect of treatment, a mild attack recurred, but yielded to anti-luetic treatment.

LATE SYPHILIS

Lane, J. E. (*J. A. M. A.* 82:852, Mar. 1924) reports with excellent photographs two cases of syphilitic bursitis, a rare condition. Lane feels that this condition is much less rare than the literature would seem to indicate and that syphilis is not often thought of as a possible cause of bursitis.

Adair, F. E. (*Ann. of Surg.* 79:44, Jan. 1924) finds out of 1674 cases supposed to be carcinoma of the breast, one case of syphilis. The gumma appears as a painless, smooth surfaced lump, very hard, movable, the nipple not retracted. It breaks down and gives rise to a syphilitic ulcer which seems to be carcinoma at first because the gumma is of stony hardness, painless, and involves the skin. In the differential diagnosis, he suggests a careful history, presence of other syphilitic manifestations, a growth more rapid than that of carcinoma, the absence of nipple retraction, frequently a positive Wassermann, and a positive therapeutic test.

CENTRAL NERVOUS SYSTEM

Chesney, A. M. and Kemp, J. E. (*J. A. M. A.* 83:1725, Nov. 29, 1924) state that it is now universally admitted that treponemata may invade the nervous system at the time of early dissemination. Using the spinal fluid of patients with early untreated syphilis, and selecting only those with a normal cell count, globulin, mastic curve, and Wassermann reaction, they inoculated two rabbits with each immediately after withdrawal. Positive inoculations were obtained with five of the thirty-four fluids. The negative cases were most carefully checked up by lymph node examination and reinoculation into the second rabbit of emulsified lymphnode of the first. Their results indicate that one is not justified in concluding that an apparently normal spinal fluid at this stage is ever free from virulent treponemata and suggest that greater significance than has generally been considered necessary should be given to minor deviations from the normal in the routine tests.

Stokes, J. R. and Shaffer, L. W. (*J. A. M. A.* 83:1826, Dec. 6, 1924) report the results secured in the treatment of 405 cases of neurosyphilis, in which at least two arsphenamine courses were given and in which patients were under treatment and observation for a period of at least two years. The intravenous use of arsphenamine and the simultaneous administration of a soluble mercurial salt intramuscularly and sodium iodide intravenously, alternating with inunctions, and in resistant cases the Swift-Ellis method has been the usual form of treatment. Results rating good including practically complete clinical and serological cure were obtained in 90.9 per cent of cases of meningeal neurosyphilis, 74.5 per cent of cerebrospinal syphilis, 48.3 per cent of tabetic neurosyphilis, and 38.9 per cent of the vascular type. In 3 per cent of the first group, 10.6 per cent of the second, 15.8 per cent of the third and 22.2 per cent of the fourth, no improvement was obtained. The outlook for true general paralysis remains hopeless though temporary improvement may be noted at times. They state that serological findings in general paralysis must not be accepted as establishing a clinical diagnosis since some apparently preparalytic patients when judged by the blood and spinal fluid alone, will yield to any determined treatment.

Fordyce, J. A., Rosen I., and Myers, C. N. (*Amer. Jour. of Syph.* 8:193, April 1924) made determinations of the arsenic content of 76 specimens of spinal fluid when 15 per cent sodium chloride solution was given and followed six hours later by neo-arsphenamine. They found the amount of arsenic in the spinal fluid after this procedure less than after the Swift-Ellis method of treatment.

Shaffer, L. W. (*Arch. of Derm. and Syph.* 10:209, Aug. 1924) reports a case of asymptomatic neurosyphilis developing during systematic treatment: a case of primary syphilis in which the spinal fluid examinations made in the first six months were negative. Early in the second course a beginning lymphocytosis was found which increased on subsequent examinations. After a three months' rest period the blood Wassermann became positive, and also the Wassermann in the spinal fluid. There were 53 lymphocytes and a paretic type of colloidal gold reaction. There were, however, no signs or symptoms which would lead one to expect such findings.

Weiss, M. and Izgur, L. (*J. A. M. A.* 82:12, Jan. 5, 1924) from a study of 1633 unselected mental defectives find that syphilis is even less common in this group than in the general population, and feel that it is an incidental finding in mental defectives: if it bears any relationship to the abnormal mental state in children it is recognisable as frank juvenile paresis or tabes.

Marie, A. and Kohen, V. (*Bull. Med.* 91:536, April 29, 1924) report on the treatment of 90 patients with general paralysis treated with bismuth and tuberculin. They usually employed ten or twelve injections of the latter at intervals of three or four days followed the next day by bismuth. They found good effects in other forms of neurosyphilis as well as in paresis.

Van Loon, H. F. and Kirschner, L. (*Klin. Wchnschr.* 3:2001, Oct. 28, 1924) inoculated eight paretics with parasites of benign tertian malaria, and four with malignant malaria by mistake. Eight of the cases were refractory to the method, possibly because they had lived in the tropics from birth.

Merzbacher, L. (*Semana Med.* 2:433, Aug. 21, 1924) reports on the use of malaria in fifteen cases of general paralysis. Fifty per cent showed satisfactory improvement in a short time, while four patients who had not responded to the usual methods of treatment showed pronounced benefit with malaria.

Askgaard, V. (*Ugesk. f. Lager* 86:307, Apr. 10, 1924) reports twelve cases of paresis out of thirty-seven who were able to return to work without serious psychic symptoms. Eight showed some improvement, two were readmitted to the hospital. No serious complications were observed and the malaria was soon controlled by quinine.

Scherber, G. and Albrecht, O. (*Med. Klin.* 20:1326, Sept. 21, 1924) also report good results and find remarkable influence on the optic and auditory nerves from malarial treatment.

Grant, A. R. and Silverston, J. D. (*Lancet* 1:540, Mar. 1924) found serological improvement in a fair percentage of forty cases of general paralysis treated by malaria.

Hines, L. E. (*J. A. M. A.* 83:1161, Oct. 11, 1924) reports the case of a man with a chronic meningeal syphilis who acquired estivo-autumnal malaria and died. The anatomical findings showed no evidence that the syphilitic lesions had been in any way changed by the malarial infection; typical malaria and typical syphilis pathologically were present.

Two articles suggested by the previous ones might be included here, though not having to do with the central nervous system.

Kyrle, J. (*Wien. Klin. Wchnsch.* 37:1105, Oct. 23, 1924) impressed with the good results obtained by the use of malaria in neurosyphilis tried it in patients with normal cerebrospinal fluids. He began with a course of neoarsphenamine, giving 3 gm. within four weeks, then inoculated with malaria. After the eleventh chill he gave 0.5 gm. of quinine intravenously and repeated the dose in eight hours. The next day he gave a 0.45 gm. dose of neoarsphenamine followed by two quinine injections in 24 hours. Neoarsphenamine was then continued up to 3 gm. in four weeks. No recurrences of malaria were observed and patients who were sensitive to arsenic before had no further disturbance from it afterward. He declares that results from this method of treatment are the most satisfactory yet devised.

Vaiciuska, P. (*Ann. of Derm. et Syph.* 5:93, Feb. 1924) reports two cases in which patients with syphilis developed typhus fever. In both cases the Wassermann reaction was positive after vigorous treatment, but after the typhus fever the blood became negative, and to all appearances the syphilis was cured.

CONGENITAL SYPHILIS

Watzold, P. (*Deutsche med. Wchnschr.* 50:11, Jan. 1924) examined the eyes of syphilitic fetuses and infants and found many spirochetes present, especially in the circumference of the cornea and in the equatorial part of the choroid.

Fordyce, J. A. and Rosen, I. (*Arch. of Derm. and Syph.* 9:355, Mar. 1924) review in detail the results of treatment of 612 children with congenital syphilis. They show that it requires persistent and systematic treatment to reverse the Wassermann reaction in children from three to eleven years of age. Negative clinical and serological findings at birth do not always rule out syphilis and they advise routine examinations at monthly intervals for the first six months and every three months for the first two years. Microscopic examination of the placenta may be of greater diagnostic value than the Wassermann reaction on the blood from the umbilical cord or from the veins during the early months of life.

LABORATORY TESTS

Strictly technical articles on this subject have purposely been omitted.

Keim, H. L. and Kahn, R. L. (*Arch. of Derm. and Syph.* 10:722, Dec. 1924) have studied the Kahn precipitation test in comparison with two Wassermann tests of different sensitiveness in 2600 cases. In primary syphilis, the Kahn test was found slightly more sensitive than either Wassermann. In secondary syphilis all three methods agreed. In late cases the Kahn test was found slightly more sensitive than both Wassermanns: except that in visceral syphilis it compared with the more sensitive Wassermann. In cerebrospinal syphilis the Kahn test fell midway between the other two. In latent syphilis the Kahn test compared favorably with the long ice-box fixation Wassermann. In congenital syphilis the Kahn test was slightly more sensitive than the two Wassermanns. In about 2,000 non-syphilitic controls the Kahn test gave two one plus reactions and two two plus reactions in dermatological conditions which appeared to be non-syphilitic.

Chapman, O. D. (*Arch. of Derm. and Syph.* 9:607, May 1924) carried out some tests on patient's blood collected on paper and found that it can be used successfully in the complement-fixation test for syphilis, and that it may be kept for at least one month with little deterioration of its complement-fixing power. The method is simple, and if satisfactory has advantages over the present technic of blood collection. Further work is being conducted in order to determine the reliability of this method.

UNTREATED OR INADEQUATELY TREATED SYPHILIS

Stokes, J. H. and DesBrisay, H. A. (*Amer. Jour. of Syph.* 8:558, July 1924) report on a study of 413 cases of syphilis, some untreated, some treated by small amounts of oral medication, and some by modern though inadequate methods. They find about 30 per cent tendency to Wassermann negativity with a mere lapse of time in untreated cases, especially in neurosyphilis. This does not necessarily mean symptomatic arrest, for 7.5 per cent of the series were active in spite of complete serological negativity. In 208 untreated cases less than one per cent showed complete clinical and serological spontaneous arrest. Cutaneous and osseous syphilis seem mutually exclusive of neurosyphilis. Cases treated by modern intensive methods though inadequately, exhibit a definitely lower proportion of complications than the untreated or mouth treated cases. The status of the syphilitic as a carrier may justify the use of intensive methods even very late in life in fresh infections.

ARSPHENAMINE AND BISMUTH IN PROPHYLAXIS

Rostenberg, A. (*J. A. M. A.* 82:207, Jan. 19, 1924) reports the case of a woman known to have been exposed to an open chancre, who failed to develop syphilis: only four doses at four day intervals of 0.45 gm. of neoarsphenamine were given, the first dose six days after exposure.

Greenbaum, S. S. and Harkins, H. J. (*Arch. of Derm. and Syph.* 10:409, Oct. 1924) attempted to determine the prophylactic value of arsphenamine within the first twenty-four hours of infection in rabbits, employing the equivalent adult dose of neoarsphenamine, arsphenamine and sulpharsphenamine. Their results uniformly show that equivalent doses when given as early as three hours after inoculation, in rabbits do not prevent the development of syphilis. On the other hand they describe two experiments in man reported in the foreign literature. In the first, a man inoculated himself with serum which contained a large number of treponemata, and one hour later took an intravenous injection of arsphenamine. Over a period of eleven months of observation the Wassermann tests remained negative. In the second experiment a man 16 hours after inoculation took two grams of the sodium salt of the acetyl derivative of oxyaminophenylarsinic acid, without developing syphilis during a period of observation of 47 days.

ARSPHENAMINE

Pick, E. (*Derm. Wochnschr.* 78:15, Jan. 5, 1924) tested the skin sensitiveness to external contact with arsphenamine in a patient who had had postarsphenamine dermatitis. A one per cent solution was painted on the skin, and all parts reacted, especially the axillary folds. A weeping dermatitis developed within 48 hours. Quinine, iodoform, iodin, turpentine, and formaline were used with negative results, thus ruling out general hypersensitiveness. External, sub-cutaneous, and internal use of sodium cacodylate, Fowler's solution, and solarson failed to cause a dermatitis, and the writer concludes that the arsenic constituent of the arsphenamine was not the cause.

Habermann, (*Dermatol. Wochnschr.* Jan. 1924) reports one case of argyria which developed in a patient who received 20 gm. of silver arsphenamine in the course of three years. He feels, however, that the improvement offset the disfigurement.

Weitgasser, H. (*Med. Klinik*, 20:113, Jan. 27, 1924) advocates the use of 50 per cent grape sugar solution as a vehicle for arsphenamine as it seems to decrease the toxic action for such patients as do not tolerate the arsenic alone.

Rostenberg, W. (*J. A. M. A.* 82:682, Mar. 1924) after experimental administration of neoarsphenamine intraperitoneally in rabbits treated one congenital syphilitic baby by that method with satisfactory results. Though in some cases in rabbits a mild peritonitis is induced, he feels that it is a safe procedure and may be of aid in the treatment of some cases of congenital syphilis. It should be given concentrated rather than diluted.

Littman, S. and Hutton, J. G. (*J. A. M. A.* 82:868, Mar. 15, 1924) found that the rectal administration of arsphenamine in children with acute manifestations of congenital syphilis gave too feeble results to warrant its use. The "Supsalves" suppositories even when given twice daily to patients with primary and secondary syphilis failed to destroy the treponemata in the lesion or to exert any noticeable influence on the eruption.

Peacock, A. H. (*Urologic and Cutaneous Review*, 9:514, 1924) reports two cases of petechial eruption resembling purpura hemorrhagica, following the intravenous administration of sulpharsphenamine.

Stokes, J. H. and Behn, C. W. (*J. A. M. A.* 83:242, July 26, 1924) found that local reaction from sulpharsphenamine administered intramuscularly was negligible. The effect was not inferior to that obtained previously with arsphenamine, while neurological syphilis yielded better than with the latter drug. Cardiovascular syphilis is favorably influenced, but reactions appear to be more frequent than with the other arsenicals.

Belding, D. L. (*Arch. of Derm. and Syph.* 9:470, Apr. 1924) in an especially good article on sulpharsphenamine reports the drug as effective in healing syphilitic lesions as neoarsphenamine, but finds that it caused a greater proportion of toxic disturbances in his series of patients. There was considerable frequency of dermatitis and peripheral neuritis when patients were given over three quarters of

the maximum standard amount of neoarsphenamine. The toxicity seemed greater when given intravenously than intramuscularly.

Boone, F. H. and Weech, A. (*Amer. Jour. of Dis. of Child.* 27:39, Jan. 1924) find sulpharsphenamine a safe and easily administered drug in the treatment of congenital syphilis in infants. It may be given to infants in as large a dosage as 20 mg. to the kilogram of body weight. Symptoms disappear rapidly, and the patient's general condition improves quickly after treatment.

TRYPARSAMIDE

Ebaugh, F. G. and Dickson, R. W. (*J. A. M. A.* 83:803, Sept. 1924) report jaundice following injections of tryparsamide, in one case very mild, in one case severe with definite evidence of impairment of liver function, and one case of dermatitis much more mild than is usual in poisoning by the arsphenamine group. They did not use the drug in any case showing optic strophy. In only one case did this condition develop after treatment was started. They report two cases of neurorelapse, both later improving to a better condition than before treatment was started.

Viner, N. (*Canad. M. A. J.* 14:719, Aug. 1924) reports the cases of a small number of patients with general paralysis who were restored, at least for the time being, to the state of apparent normal mentality by the use of tryparsamide. He believes he saw a case of Argyll-Robertson pupils restored to normal.

Lorenz, W. F. et als (*Amer. Jour. of Med. Sciences* 168:157, Aug. 1924) found that beneficial clinical results usually precede serological improvement. In 185 cases, visual disturbances occurred in 7 per cent, and in taboparesis 23 per cent were thus affected. Of thirteen cases showing amblyopia all but one cleared up on suspension of the drug. The remaining twelve were subsequently treated with tryparsamide without further ocular disturbances.

Solomon, H. C. and Viets, H. R. (*J. A. M. A.* 83:891, Sept. 20, 1924) are a little less enthusiastic concerning tryparsamide. In some cases, it gives better results than can be obtained in older methods, and in some cases it does not give such good results. Its ease of administration without any discomfort to the patient is much in its favor.

Moore, J. E., Robinson, H. H. and Keidel, A. (*J. A. M. A.* 82:528, Feb. 1924) report on the use of tryparsamido. They feel that it is a more effective drug in certain types of neurosyphilis than any other now at our disposal. In other forms of syphilis it is of little or no value unless perhaps in the cardiovascular type. It is to be avoided in all cases in which optic nerve impairment exists, and during treatment close attention should be given to the fundus.

Moore, J. E., Robinson, H. H. and Lyman, R. S. (*J. A. M. A.* 83:888, Sept 20, 1924) report on further treatment with this drug which in the later reports is considered as favorable as in the early.

Wile, U. J. and Weider, L. M. (*J. A. M. A.* 83:1824, Dec. 1924) also report striking improvement in many cases of cerebrospinal syphilis with tryparsamide especially the paretic type, yet there was no improvement in the spinal fluid findings.

SODIUM THIOSULPHATE IN ARSENICAL MERCURIAL POISONING

Harrell, B. E. (*Virginia Med. Monthly*, 51: 274, Aug. 1924) reports a case of arsphenamine dermatitis treated with sodium thiosulphate by mouth. The initial dose was 2 gm. followed by 1 gm. three times a day. Improvement was very satisfactory.

Semon, (*Brit. Med. Jour.*, Jan. 1924) is in accord with the statements of McBride and Dennie in regard to the value of this drug.

Armuzzi, G. (*Policlinico* 31:740, June, 1924) obtained such good results in the treatment of cases of arsphenamine and mercurial poisoning that he was able to resume treatment again in ten days.

Bugg, C. R. and Fockoff, C. (*Arch. of Derm. and Syph.* 10:518, Oct. 1924) report the case of a child of two and a half years who developed an ex-foliative dermatitis after six injections of sulpharsphenamine. After four doses of sodium thiosulphate the dermatitis cleared up in the course of six days.

BISMUTH

Myers, C. N. and Corbitt, H. B. (*Amer. Jour. of Syph.* 8:578, July 1924) after a series of experimental investigations state that the same question of absorption, retention, and elimination, as discussed by Cole and his co-workers in the use of intramuscular mercury find application in the intramuscular use of bismuth. The variability of absorption is of importance because of the uncertainty of the dosage and the delayed toxic effects which cannot be handled when the drug is deposited deeply in the muscles. Also the failure of absorption is important and accounts for many unfavorable reports regarding the use of the drug. The soluble preparations are well absorbed, but are more painful and have a higher toxicity.

Shivers, C. H. deT. (*Arch. of Derm. and Syph.* 10:414, Oct. 1924) feels that bismuth should not be used in early syphilis as a substitute for arsenic except in patients resistant to that drug. Bismuth is effective in all forms of late syphilis and neurosyphilis but it should be given with caution and should be checked up if possible by the X-ray.

Leredde, (*Bull. Soc. de Franc. de Derm. et Syph.* 31:18, Jan. 10, 1924) reports a case of nitritoid crisis following the second injection of a preparation of bismuth, consisting of engorgement of the lips, tongue, and skin, and a

brief loss of consciousness, followed by aphonia. He thinks that other substances than bismuth in the preparation might account for the disturbances, possibly guicol or camphor.

Courcoux and Routelier, (*Bull. Soc. de Franc. de Derm. et Syph.* 31:59, Feb. 1924) record the development of a pruritic eruption composed of erythemato-squamous patches and follicular papules, immediately following injections of bismuth. The hands, legs, and face alone were free. Arsphenamine injections were borne without any disturbance.

Martin, (*Derm. Zeitschrift* 40:139, Feb. 1924) used bismuth in the treatment of early primary syphilis and found that the Wassermann changed from negative to positive in spite of treatment in 15 out of 19 cases. This incidence compares very unfavorably with the results from neoarsphenamine.

Hudelo, and Rabut, (*Presse Med.* 32:312, Apr. 9, 1924) call attention to the necessity of having the teeth cared for before beginning a course of bismuth. There should be a suspension of treatment after the appearance of albuminuria. General depression varying from slight fatigue to actual asthenia sometimes occurs, but this reaction is transient. None of the by-effects of bismuth seem to be serious.

MERCURY

Cole, H. N., Hutton, J. G., and Sollmann, T. (*J. A. M. A.* 82:199, Jan. 12, 1924) suggest the "clean inunction" method, that of cleaning the skin after rubbing with benzine. They now report on a series of 86 patients, some treated by this method and some by the older. Of the patients treated by their method 91.2 per cent showed mercurialism while only 83.3 per cent treated by the older method were similarly affected, showing that the "clean inunction" method is by no means inferior.

Cole, H. N., Hutton, J. G., Rauschkolb, J. and Sollmann, T. (*J. A. M. A.* 83:593, Aug. 1924) tested out the intravenous administration of metallic mercury suspension (mercodel). They found marked rapid improvement in the lesions, but relapses were frequent. There seemed to be little effect on the kidneys and the intestines. Stomatitis was not unusual, sometimes very severe and in one case fatal. The irritation of the veins was the serious objection and they feel that the dangers are too great to warrant the use of mercury suspension by this method. Intramuscular injections were given, but they were very irritant and the therapeutic results were less satisfactory.

Zwick, K. G. (*J. A. M. A.* 83:1821, Dec. 6, 1924) reports the interesting study of absorption of mercury inunction from the skin of animals. His findings confirm the observations of others: that the absorption occurs through the hair follicles and gland ducts, but not appreciably through other skin structures. This supports the "clean inunction" method suggested by Cole et al. Mercurial globules could not at any time be found below the stratum disjunctum, therefore the removal of the superfluous mercurial ointment from the surface will not detract from its efficacy, because it would never be absorbed if left in this location.

FLUMERIN

Snodgrass, (*Lancet*, Jan. 1924) employed intravenous flumerin and finds that while no other mercurial produces changes so rapidly, the action is not lasting as relapses occur frequently and sometimes when the drug is being administered. The Wassermann is usually not reversed. Occasionally mercurial poisoning comes early while in some cases great toleration is noted.

IODIDES

Kolmer, J. A. and Lucke B. (*Arch. of Derm. and Syph.* 9:242, Feb. 1924) have previously reported on histologic changes produced in experimental animals by the use of the arsenicals, mercury and bismuth. Their studies on the iodides are summarized as follows: administration to rabbits by a stomach tube of potassium and sodium iodid in repeated large doses equivalent to approximately as much as 15 gm. per 60 kilograms as well as single intravenous injections in amounts equivalent to appoximately 30 gm. per 60 kilograms did not cause changes in brain, heart, and suparenals. The kidney, liver, lungs and spleen showed slight tissue reactions which may be interpreted as the result of a mild irritation. Dosage, compound and route of administration did not produce any essential differences in the histologic changes. These findings are in marked contrast to the well definied degenerative lesions produced by arsenic, mercury and bismuth.

FUSIFORM BACILLI AND SPIROCHETES

Pilot, L. and Kanter, A. E. (*Arch. of Derm. and Syph.* 10:561, Nov. 1924) have made various studies on this subject which is sufficiently related to syphilis to be reported here. They found fusiform bacilli as well as spirochetes frequently in the smegma secretion of normal women. They play no role in the production of leukorrhea. They are important infecting agents in syphilitic lesions of the vulva, erosive and gangrenous vulvitis, condylomata acuminata, necrotic fibroids, and carcinoma of the uterus and vagina. Infection with these organisms is characterized by necrosis and foul odor. The presence of these organisms normally would indicate that many ulcerative processes about the genitalia are due to autogenous infections and are not necessarily the result of bacteria from other sources.

Case Records of the Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY
RICHARD C. CABOT, M.D., AND HUGH CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 11331

MEDICAL DEPARTMENT

An American clergyman of eighty-one entered April 8 complaining of hemorrhage from the bowel and a feeling of dizziness and weakness on standing up. His past history, which seemed accurate, was entirely negative except for blood poisoning about forty years before admission, treated in this hospital.

The morning before admission he began to feel nauseated, but could not vomit even after taking mustard water, and had very severe pain in the epigastrium whenever he tried to vomit. He then took two bromoquinine pills and a tablespoonful of Pluto water to move his bowels. Later in the morning he felt as though his bowels would move. On the way to stool he fainted. Since that time he had felt dizzy whenever he stood up, and once during the afternoon he fell again. His bowels had moved quite frequently. The morning of admission he passed a large dark bloody stool. At admission he felt weak and on standing felt dizzy but had no pain.

Examination showed a robust, well built man of eighty-one, quite pale. The apex impulse of the heart was not found. The percussion measurements are not recorded. A soft blowing systolic murmur was heard at the apex. The blood pressure was 115/70. Rectal examination showed the prostate moderately enlarged. The rest of the examination was negative.

The temperature was 97.9° to 101.3°, the pulse 88 to 126, the respiration 12 to 35. The urine is not recorded. The hemoglobin was 70 per cent., the leucocytes 20,600, the reds 3,680,000.

The patient complained of a feeling of fullness in the chest. He tried to belch gas, but could not. He said he was not nauseated. The pulse was very weak at the wrist. April 10 hourly blood pressure and pulse findings beginning at 12:30 were:

Blood pressure:	85/65	70/58	70/56	72/54	70/54	74/60	70/60
Pulse:	106	120	120	126	120	122	108

A subpectoral of 250 c.c. of 2½ per cent. glucose was given and surgical transfusion of 600 c.c. of blood was done. He showed little improvement from the transfusion. The blood pressure went up temporarily to 90, but rapidly dropped to 70 and remained there. He grew gradually weaker and April 12 died.

DISCUSSION

BY DR. MAURICE FREMONT-SMITH

There is rather little to say with regard to this story. It is evident that a hemorrhage from some part of the gastro-intestinal tract occurred. A profuse hemorrhage from the gastro-intestinal tract usually takes its origin in the stomach or duodenum, and is more likely to be due to ulcer than to carcinoma. It must be remembered also that in purpura massive hemorrhage from the gastro-intestinal tract may occur, as also in cirrhosis (from the bursting of dilated esophageal veins) and in Banti's disease. Carcinoma is more apt to give steady small oozing of blood, although of course large hemorrhage may occur. The advanced types of colitis, tuberculous, or infectious ulcerative, produce hemorrhage, but in small amounts. In fact massive hemorrhage is rare in these conditions. Carcinoma of the cecum or colon must be considered as the cause of hemorrhage, but obstructive symptoms are far more likely to occur preceding hemorrhage and the bleeding, again, is apt to be less in amount.

So far, then, the diagnosis apparently lies between ulcer of the stomach or duodenum and carcinoma of the stomach. It must be borne in mind that attacks of acute indigestion occurring in older people are usually in fact attacks of angina, or coronary thrombosis. The pain in the latter is intense, substernal, unrelieved by even moderately large doses of morphia, accompanied by a fall in blood pressure and evidence of prostration. Sometimes, although usually not at the inception, a pericardial friction may be heard. The pain of coronary thrombosis is sometimes referred to the abdomen and may be confused with an acute abominal emergency.

It might be of interest to add that the pain of the simple pericarditis may be likewise referred to the epigastrium or midabdomen, and with the slight fever and high white count may easily simulate an attack of acute appendicitis. Only a most careful examination of the heart and the finding of general rather than localized spasm of the abdominal muscles may differentiate these two conditions early. Later on, that is after the first twelve hours, a pericardial friction rub usually becomes pronounced.

Now as regards the differentiation between ulcer and carcinoma. Of course it is unusual for an ulcer to exist for years without symptoms and to cause finally a massive hemorrhage at such an advanced age. That hemorrhage may be the first and only symptom of ulcer, however, is well known, as may likewise be perfora-

tion. To my mind it is even more unlikely that carcinoma of the stomach should begin at the age of eighty-one. Carcinoma of the stomach usually appears between forty-five and fifty-five, athough it may well appear earlier; but it is rather rare to have it come on after sixty, and once in existence the progress is usually quite rapid. We should therefore expect that if this man had developed carcinoma of the stomach at, say, the age of sixty-five, he would be a sick man at seventy. It therefore seems to me more probable that we are dealing with an ulcer of long standing than with carcinoma.

It is interesting to speculate as to the actual cause of death. Unless hemorrhage into the bowel was excessive in the four days of hospital stay it is hard to see how this man could die from exsanguination, his hemoglobin being 70, the red count 3,500,000 three days before death, and there being no evidence in the history that much blood was lost during his stay in the hospital. Can it be that an acute dilatation of the stomach, the stomach filling with bloody material, may have been the cause of cardiac embarrassment, falling blood pressure and death? An examination of the pulse findings is another argument against death from exsanguination. The pulse came down toward the end rather than rising as it would do if this man were bleeding to death. It must not be forgotten that whereas a rising pulse is one of the essential signs of loss of blood, there is a condition in which bleeding may take place even to the point of exsanguination without the occurrence of a markedly high pulse rate. I refer to cases of jaundice in which the pulse rate is retarded by the jaundice, and in which a steady rise in pulse from the preoperative rate of 50-60 to 100-110 is just as significant of hemorrhage as a steady rise from 80 to 140-150 in a patient without jaundice.

Has this man died from infection? We find that his temperature rose to 101.3°. Was this a terminal rise? How are we to explain the leucocyte count of 20,000 in the absence of marked secondary anemia, without infection being present? If infection was present where are we to expect to find evidence of it at necropsy?

There is no evidence of a pneumonia, although it would not surprise me to find that the lungs showed hypostatic pneumonia at the bases. We know nothing about the urine. We have no blood smear. We have no story of bleeding from other regions than the stomach. Have we got to consider some type of chronic leukemia?

I believe the diagnosis of duodenal ulcer with possible hypostatic pneumonia is the best that I can do with the evidence at hand.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Perforated duodenal ulcer?

Internal hemorrhage.
Transfusion.

DR. MAURICE FREMONT-SMITH'S DIAGNOSIS

Duodenal ulcer.
Possibly hypostatic pneumonia.

ANATOMICAL DIAGNOSIS

1. *Primary fatal lesion*

Ulcer of the duodenum with hemorrhage into the gastro-intestinal tract.

2. *Secondary or terminal lesions*

Arteriosclerosis.
Fibroid myocarditis with hyalin degeneration.
Hypertrophy and dilatation of the heart.
Edema of the lungs.
Anemia.
Slight hydrothorax.

3. *Historical landmarks*

Slight chronic pleuritis.
Obsolete tuberculosis, apices of the lungs.

DR. RICHARDSON: The head was not examined.

The skin and mucous membranes were very pale.

The esophagus and stomach were negative. The mucosa of the duodenum, posterolaterally to the left and a short distance below the pylorus, presented a loss of substance 12 mm. long by 5 mm. wide. The margins were rounded and descended to a dirty gray-red fairly smooth base which in several places showed minute dark red papilla-like points. About it and to the base blood-like material was weakly adherent. There was much blood-like material scattered along the small intestine, which was otherwise negative. There was much blood-like material in the region of the cecum, the sigmoid and the rectum. The mucosa was negative.

The pleural cavities on each side contained about 500 c.c. of thin pale fairly clear fluid. There were pleural adhesions on each side at the apex and a few to the pericardium and diaphragm.

At the apex of each lung there was a small fibrocalcareous patch,—obsolete tuberculosis. There were no areas of consolidation. The tissue generally was markedly edematous.

The heart weighed 470 grams, moderately enlarged. The myocardium was of fair consistence, brown-red, but was mottled in several places with pale grayish irregular streaks and areas. There was no definite softening; fibrous myocarditis. Cavities: Left, slight dilatation. Right, considerable dilatation. The valves were negative. The coronaries generally showed much fibrous and fibrocalcareous sclerosis with much diminution of the lumen in places. The aorta and great branches were

capacious and showed marked fibrous and fibrocalcareous sclerosis with some areas of atheroma.

CASE 11332

Surgical Department

A New England widow of fifty-six entered March 7 complaining of epigastric ache and jaundice of a week's duration. She had been widowed for two years, working hard as a housekeeper and doing extra washing and ironing besides. She had never been strong. Many years before admission she had "congestion of the liver." Seven years before admission she had influenza. In the past five years she had had one or two attacks of "indigestion" not lasting more than a week. She had occasional burning on micturition. She passed the menopause at forty-nine.

Until two weeks before admission she was fairly well. Then she had an attack of indigestion with anorexia and epigastric distress not related to food. Seven days before admission while ironing she had sudden epigastric pain radiating to the right shoulder blade. She had been in bed ever since this attack with epigastric ache from which she was free for an hour or two every day. She had had several fairly good nights' sleep. She had been nauseated, but had not vomited. Three days before admission she found her skin and eyes were yellow, her stools colorless, her urine high colored, and her skin itching. The jaundice had grown deeper and her strength had diminished until at admission she could not hold up her head. That day there was a little brown color in the stool and the itching had disappeared.

Examination showed a thin, apathetic, very deeply jaundiced woman, very weak. The upper teeth were missing, the lower teeth carious, with pyorrhea. The anterior cervical glands were enlarged. The heart sounds were weak and not well differentiated. No measurements and no abnormalities are recorded. The blood pressure was 90/50. There was spasm and tenderness in the epigastrium. In the right upper quadrant on the right was a mass descending on inspiration as far as the level of the umbilicus and feeling like a greatly distended gall-bladder. Vaginal examination showed only a pea-sized cervical polyp. The knee-jerks were not obtained.

At entrance the temperature was 102.4°, the pulse 114, the respiration 28, all falling to normal before operation. The urine before operation was greenish, with a large amount of bile and four or five leucocytes per high power field. The quantity was insufficient for a specific gravity test. The leucocytes were 10,800. A Wassermann was negative. Clotting started at eleven minutes and was complete in twenty-four minutes. The bleeding time was three and a half minutes. The clot was retractile. The non-protein nitrogen was 78 mgm.

The day after admission the patient was more lethargic. March 9 operation was done. She made an excellent recovery from anesthesia, had no fever, and was fairly comfortable. March 12 the stool showed color. She remained lethargic and continued to vomit a little almost every day until March 16. The wound looked in excellent condition. She complained of nothing but weariness, but seemed not to care whether she lived. She took practically no nourishment, and insufficient fluids. The jaundice possibly cleared a little. A special nurse succeeded after much effort in making her intake sufficient. Her spirits improved. The skin over the back and sides was blotchy and bluish. March 26 a little pus was expressed from a through-and-through hole. Probing showed a sinus across to the fellow hole. Under novocain this sinus was adequately drained.

March 28 a second operation was done. Next morning the patient did not look so well in spite of adequate fluid and nourishment intake. Her skin had a gray tinge. That morning the respiratory rate rose sharply to 36. Later in the day signs were found at both bases. That afternoon she died.

Discussion

BY DR. EDWARD L. YOUNG, JR.

NOTES ON THE HISTORY

Of course the jaundice in this case limits our field because it means we are dealing with some condition interfering with the flow of bile into the intestine. The rest of the story of indigestion, sudden pain radiating to the shoulder blade, and obstruction of the common duct all points toward a surgical condition. Cirrhosis in any form ought not to come on so abruptly or to give such serious symptoms. The description of the jaundice is the description of complete absence of bile in the intestine and its absorption from the liver. Can we make any more accurate diagnosis as to what the cause of this is and what is best to do?

From the description her general condition is not very good. She had not much strength to stand a lot of operating. We are not told whether she has lost weight or not, but the blood pressure is low and she is very thin.

DIFFERENTIAL DIAGNOSIS

It seems to me that the two main things to consider are acute biliary tract infection with stone in the common duct and a possible but hardly probable malignant disease. In favor of the stone are the pain, the acute onset, the complete obstruction to the common duct and the temperature.

I always take with a grain of salt the "palpable mass in the right upper quadrant," be-

cause it may be simply something that the examiner wanted to find and therefore did find. If true it means either an acutely inflamed and therefore much distended gall-bladder or a malignant disease, according to the law of Courvoisier. The non-protein nitrogen is high. There is no serious evidence in the blood of possible bleeding. I should put first the acute cholecystitis with stone in the common duct.

Now the question of what should be done at operation of course depends on what is found. Taking into consideration the general picture it is fair to say that the less that can be done to her which will restore adequate liver drainage the better chance she has of recovering from the operation. The majority of cases are cured by drainage, and at least it gives a live patient for the second operation in case that is necessary. I should put malignant disease and pancreatitis as very poor seconds.

DR. YOUNG'S PRE-OPERATIVE DIAGNOSIS

Cholecystitis and cholangitis.
Stones in common duct.
Hepatic insufficiency.

PRE-OPERATIVE DIAGNOSIS MARCH 9

Cholelithiasis.
Stone in the common duct.

FIRST OPERATION

Gas and ether. Right upper rectus splitting incision. The liver was enlarged and very dark in color, with marked perihepatitis in the region of the gall-bladder. The gall-bladder was contracted down upon a mass of several hundred small faceted stones. There was much thickening about the cystic and common ducts so that it was impossible to distinguish them. The gall-bladder was cut across at the ampulla, which apparently opened directly into the common duct. The hepatic duct was dilated to three-quarters of an inch in diameter and contained many stones. The common duct was smaller than the hepatic duct and contained a few faceted stones. All the ducts were examined, and an effort was made to remove the stones with various forceps. The duct was also washed. A large uterine probe was put through the papilla into the duodenum. There was much bleeding from the common and hepatic ducts.

PATHOLOGICAL REPORT

A small fibrous gall-bladder with a smooth mucous surface and many small stones. Microscopic examination shows the mucous membrane eroded and the wall thickened by fibrosis and infiltrated with wandering cells.

Chronic cholecystitis.
Cholelithiasis.

Following the operation about ten ounces of bile drained from the wound daily.

FURTHER DISCUSSION

Statistics tell us that the mortality is enormously increased where the disease has gone on to the presence of stones in the duct as distinguished from stones in the gall-bladder alone. From the description of the operation it seems as though there was a very strong possibility of leaving behind some stones, and although this is relatively common the drainage will usually look out for those left behind.

I should say that the description of the course after operation is consistent with any fairly sick patient who has had a serious operation. From the facts that we are given I do not know what to believe the second operation is, but certainly it must have been some fairly urgent condition like a large stitch abscess, because she is in no condition to stand any unnecessary handling.

SECOND OPERATION

As the patient was going steadily downhill without any evidence of a definite lesion it was decided to do a jejunostomy for the purpose of feeding and returning the bile to the intestine. Under local infiltration with novocain a left gridiron incision was made at the level of the umbilicus. A loop of jejunum was brought up into the wound and a circular silk purse string suture made. The gut was stabbed with a knife within the circle and a Number 16 catheter was thrust into the jejunum for about three inches and secured to the gut wall with a catgut stitch. The purse string was drawn tight and tied. A second purse string was applied at a point half an inch distal to the first. A catheter was then laid down along the wall of the jejunum proximally and was buried there with interrupted catgut stitches for a distance of three inches. The jejunum at the point of entrance to the catheter was then sutured to the peritoneum and the wound closed in two layers.

The following day bile from another patient with a tube still in the common duct was pressed into service.

FURTHER DISCUSSION

They tried a manoeuvre which has been said to work under certain conditions, but which would seem like handing a patient as sick as this quite a bit of additional load. The apparent result so far as benefit was concerned was nil. From the last two lines it sounds as though a respiratory infection supervened and killed her. I should be interested to know whether or not Dr. Richardson found that all the stones had been removed from the common and hepatic ducts.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Cholelithiasis.
Bronchopneumonia?

Cholecystectomy with drainage of common duct.
Jejunostomy.

DR. EDWARD L. YOUNG'S DIAGNOSIS

Cholelithiasis.
Cholangitis.
Pneumonia.
Stones in hepatic or common duct.

ANATOMICAL DIAGNOSIS

1. *Primary fatal lesions*

(Chronic cholecystitis.)
(Cholelithiasis.)
Stones in the hepatic duct.
Cholangitis.

2. *Secondary or terminal lesions*

Focal and lobar pneumonia.
Abscesses of the left lobe of the liver.
Suppurating gland along the wall of the inferior cava.
Thrombophlebitis of the inferior cava.
Soft spleen.
Abscesses of the kidney.
Localized peritonitis.
Icterus.

3. *Historical landmarks*

Operation wounds.
Slight chronic pleuritis.

DR. RICHARDSON: The head was not examined.

The skin generally was pale yellowish, and the conjunctivae showed a slight tinge.

In the anterior abdominal wall a little to the right of the median line there was a linear scar 17 cm. long. The central portion of the scar was open for a length of 3 cm. In the lower left quadrant there was an operation wound 9 cm. long partly closed with sutures.

In the region of the upper right quadrant near a tract leading down from the open portion of the linear scar to the region of the gall-bladder there was a moderate amount of localized peritonitis. A short distance down from the upper end of the jejunum there was a jejunostomy wound. The small intestine was otherwise negative. The large intestine was slightly distended, otherwise negative.

The retroperitoneal glands showed some blackish pigmentation. The anterior margin of the liver was 5½ cm. below the costal border in the right mammillary line. The diaphragm was at the lower border of the fourth rib on the right, at the fifth rib on the left.

The right pleural cavity contained about 150 c.c. of thin purulent fluid. The left pleural cavity contained about 200 c.c. of thin dirty red cloudy fluid. There were pleural adhesions on each side at the apex and to the pericardium. The trachea and bronchi contained much dirty reddish frothy fluid and purplish purulent fluid.

In the posterior portion of the upper lobe of the right lung there were several small foci of gray-red pneumonia. The lower lobe on this side was voluminous and showed frank gray-red pneumonia involving at least two-thirds of the lobe. The pleura over the lower half of this lung was coated with exudate. The tissue of the left lung was like that of the other except that the pneumonia in the lower lobe involved about half of it. The pleura was coated with fibrinous exudate.

The heart weighed 292 grams, full size. The myocardium, valves, and coronaries were negative. The aorta and great branches were negative except that the intima of the aorta showed much purplish staining, sepsis. The venae cavae were negative except as described under the liver.

The liver weighed 1675 grams. There were a few scattered old adhesions to the diaphragm. The tissue was of fair consistence and bile stained. About midway of the spigelian lobe and extending along the left side of the inferior cava there was a small collection of pus which rested in a moderately enlarged soft broken-down gland-like mass. This purulent infiltrated mass was closely applied to the wall of the inferior cava, and along the intima of the cava opposite it there was a small frank patch of thrombophlebitis. The section surfaces of the liver in the region showed a few scattered small abscesses containing bile-stained pus. Cover glass from the pus showed leucocytes and colon-like bacilli.

The gall-bladder was wanting. In the region of the cystic duct there was suture material. The hepatic and common ducts were dilated, 3 cm. in circumference. In the region of the lower part of the hepatic duct there were five stones, 3 mm. to 8 mm. in greatest dimension. In the region of the junction of the hepatic and common bile ducts there was a small slender shallow pouch-like diverticulum in which one of the stones rested. The mucosa of the hepatic duct was dirty grayish red, showed a few slight erosions, and was coated with purulent material which extended up into the ducts in the liver. The mucosa of the common duct was negative. No stones were found in the common duct.

The spleen weighed 175 grams. The surface was smooth and the tissue pale and mushy.

The kidneys showed scattered through them smaller and larger abscesses.

Culture from the heart blood yielded streptococci and colon-like bacilli.

CASE 11333

SURGICAL DEPARTMENT

A boy nine years old was referred for study of the cause of intermittent attacks of fever.

His father, mother and four brothers were living and well. At six months of age he had an attack of fever of unknown origin lasting approximately three weeks. Ever since that time there had been intermittent attacks, at least two a year, of fever of unknown origin. Although he was not living in a malarial district it was called malaria following the examination of a blood smear during one attack when he was five years of age. There never was any localizing symptom until the attack four months before the present one, when there was pain in the left flank. The patient had been seen by various specialists who had failed to make a diagnosis, and up to eight months before the present attack no positive evidence of kidney trouble had been suggested. At that time his parents were told that he probably had a slight pyelitis, and a cystoscopy was suggested. It was interesting to note that during the attacks the urine was grossly normal, and no record of an examination was available; but the mother said that following each attack the urine was very dirty. Because of this condition the boy had spent about one-third of his life in bed.

The present attack started about three weeks before admission with fever, pain in the left flank, an increased amount of gas and increased constipation. The bowel difficulty was so marked that it was thought the trouble might be in the colon. The temperature had been intermittent, ranging to 104.5°. The urine during this attack showed a moderate amount of pus, on culture a staphylococcus aureus; no blood or crystals.

The general examination done at this time showed a well nourished boy lying quietly in bed. No evidence of trouble could be found in the throat, chest, or abdomen. There was definite tenderness in the left flank, and although no mass could be felt suggesting kidney it seemed as though something could be rolled under the finger along the normal course of the ureter. Because of the bowel symptoms a gastro-intestinal X-ray was done. No definite pathology was noted in the gastro-intestinal tract. X-rays of the urinary tract showed a normal appearing right kidney, slightly larger than it should be, a very hazy and indefinite left kidney, but with no shadows suggesting stone.

Operation was done, and three days later a second operation. The patient made an uneventful convalescence and was discharged in less than three weeks feeling better than he had felt in a long time, and with every reason to believe that the malaria was cured.

Discussion

by dr. edward l. young, jr.

The interesting thing about this case was the length of time and the persistence of the symptoms, practically ever since the child was born, with the fact that he had been studied by various very competent men, bearing out the interesting fact that other things being equal the man who gets the most facts about a given case is the man who will come nearest to making a diagnosis. Although the mother says she told each man that following each attack the urine was very dirty, no record of urinary examination had ever been made other than that it was grossly normal when the boy had been seen; and the kidney had apparently been disregarded as a source of trouble. This case emphasizes the need of getting at every possible etiologic factor.

The kidney has to be considered in any attack of intermittent fever in a child. This boy was lucky in that he went along with no more damage than he had for the nine years of his life, and did have a condition which was curable at this stage of the game. Because at this time for the first time there was definite evidence of trouble in the urinary tract, and after having very carefully looked him over for any other trouble, so that we were sure that the trouble in the intestinal tract was secondary to the kidney, the only thing left to be done, the cystoscopy, was done. Of course in a boy nine years of age this had to be done under an anesthetic. This showed a normal bladder, a right ureter which was patent with a normal jet coming through it, and on the left side a very slender worm of pus exuding from the orifice. Of course that left the diagnosis left pyonephrosis, and the only thing possible to do was operation. The stricture of the ureter gives the basis of trouble in that it was a congenital affair and the damage in that kidney had gone on ever since birth.

dr. young's pre-operative diagnosis

Left pyonephrosis?

first operation, cystoscopy

A cystoscopy was done under ether. This showed a normal bladder, normal right ureter free from obstruction, and on the left side a very slender worm of pus exuding from the orifice. No instrument, not even a filiform, could be made to pass more than three-quarters of an inch up the ureter. An attempt to force sodium bromide by the stricture in order to get a picture was unsuccessful.

second operation

Left oblique kidney incision. The only thing that could be discovered resembling a kidney was a large multilocular pus sac which was dissected out with considerable difficulty, from the lower end of which a ureter about two centimeters in diameter descended into the pelvis. The kidney remnant and the ureter were removed. Wound drained.

PATHOLOGICAL REPORT

A hydronephrotic sac 8 by 4 3 cm. The kidney tissue is almost entirely destroyed. What is left consists of a series of lobulated sacs. Section shows that the walls are thickened and often composed of a jelly-like tissue. Microscopical examination shows no evidence of tuberculosis. There are absolutely no kidney tubules or glomeruli. The jelly-like tissue is interpreted as degenerated tissue.

Hydronephrosis with infection and degeneration.

FURTHER DISCUSSION

The pathologist assured me at first that I had not removed a kidney, which interested me at the time.

There is nothing further to tell except that the boy made an uneventful convalescence and when discharged felt better than he had felt for a long time, and as we have said, we have every reason to believe that the "malaria" is cured. The interesting part, as I see it, is the fact that the one thing was disregarded which however unusual it seemed turned out to be the clue to the cause and the whole story.

DIAGNOSIS

Congenital stricture of the ureter.
Left pyonephrosis.

SUICIDE

A SLIGHT increase in self-destruction was found by F. L. Hoffman, Consulting Statistician of the Prudential Insurance Co. in this country in 1924 as compared with 1923. He found that fifteen out of one hundred thousand committed suicide but the peak of suicide rate was reached in 1908, the figure being 21.5. Hoffman finds evidence that suicides are more common among the well-to-do and well-educated classes. This latter showing seems to indicate that there is need for a more intensive study of the problems involved for in addition to the question of quality the largest percentage is found in the years of life between fifteen and forty-five and consequently society suffers in a material way because of the loss of productive activity found in this period as compared with deaths occurrin among those of more advanced years.

The British Medical Journal writes: "William Harvey died in his eightieth year on June 3, 1657, and on June 26 his remains were deposited in a vault adjoining the parish church of Hempstead in Essex. He was 'lapt in lead,' and on his breast in great letters was his name, 'Doctor William Harvey.' By the middle of the last century this vault underneath the Harvey Chapel had become ruinous. On January 28, 1882, the tower of the church fell towards the southwest; it is still a heap of stones in the church-yard. On October 18, 1883, the body was removed from the vault and placed with all due reverence in a handsome white marble sarcophagus erected by the Royal College of Physicians of London in the chapel above the vault. With it was deposited a leaden case containing the edition of the works of Harvey published by the college in 1766, and a vellum memorial recording the circumstances of the removal. It is now proposed to restore the fallen church tower as a further memorial to William Harvey. The village of Hempstead lies in a sparsely populated agricultural district, seven miles from the railway station of Saffron Walden and some fifty from London. It is therefore necessary to make a far-reaching appeal for the sum of £5,000 which is needed to carry out the project.

THE YU WANG FU ASSOCIATION

AT a recent meeting of persons interested in the Peking Union Medical College which is financed by the China Medical Board of the Rockefeller Foundation, an organization called the Yu Wang Fu Association was formed. It was decided that the purpose of the association shall be, by frequent informal meetings, to stimulate good fellowship and to continue and increase interest in the welfare of the college in those who have at any time or in any capacity worked in Peking in connection with it, and have now entered other pursuits. Dr. Franklin C. McLean, the organizer and first director of the college, was elected president; Dr. E. V. Cowdry, secretary-treasurer, and Dr. A. B. Maccallum, Dr. Charles Packard and Dr. Donald D. Van Slyke, members of the council. It is planned to establish branches of the association, of which New York is the headquarters, wherever such may be justified but particularly in Chicago, San Francisco, London, Tokyo and Shanghai. It is proposed to hold the first meeting of the association at the Marine Biological Laboratory, Woods Hole, Massachusetts, on August 1, when an address will be delivered by the secretary of the Rockefeller Foundation, Mr. Edwin R. Embree. Those wishing to join the association are requested to communicate with Dr. E. V. Cowdry, at the Rockefeller Institute, 66th St. and Avenue A, New York, N. Y.—*Science*.

AN ANATOMICAL LABORATORY

THE University of Pennsylvania is preparing to build an anatomical laboratory to cost one million three hundred thousand dollars.

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A CIRCULAR LETTER OBJECTING TO THE EXAMINATION OF MOTOR CAR DRIVERS

Henry D. Nunn who signs himself as general counsel of the Medical Liberty League Inc. has sent a circular letter to members of the Legislature in which he affirms "that an attempt will likely be made in the next session of the general court to secure the passage of a bill, the undoubted effect of which would be to increase the aggregate income of the so-called regular physicians of Massachusetts by a million dollars or more annually."

According to Mr. Nunn the bill referred to will require motor car drivers to present a certicate signed by a physician to the proper authorities to the effect that the driver has normal vision. He emphasizes the fact that the plan has been advocated by the American Medical Association and since according to his belief "an overwhelming majority of licensed physicians are members of the A. M. A.," he feels disturbed because of the prosperity which will come to physicians who are paid for making these examinations. In order to camouflage his apparently real underlying purpose, he appears to be concerned in the burden thus imposed on the people. His statements however are so clearly built around his antagonism to physicians that they will deceive no one.

Nowhere does Mr. Nunn show pity for the approximately twenty thousand persons killed by automobiles in this country or the very many thousands more who are seriously injured. His reasoning and appeal are inspired it would seem almost entirely by his distrust of the medical profession and is very much like his attitude on the question of compulsory vaccination for here again he balances the cost and discomforts of vaccination against the number of deaths due to smallpox. Few deaths to him mean that vaccination is unnecessary. If there is any one thing the medical profession stands for it is the saving of human life at all costs and we will fight the foes of humanity wherever we find them and under any banner unfurled.

So far as examinations of motor drivers are concerned, doctors would be as much inconvenienced as any class and would want all unnecessary red tape done away with but where human life is at stake physicians have been willing to meet even unpleasant regulations.

State requirements for reporting communicable diseases and births and for registration of the doctor as well as reasonable regulations for controlling the use of narcotic drugs are examples of the coöperative attitude of the profession. Although we are not sure that the best plan for the prevention of unnecessary deaths attributed to motor vehicles has been worked out, it is safe to say that the medical profession stands shoulder to shoulder with all persons honestly and unselfishly committed to progress and in adopting any plan its value to humanity will be the important consideration.

NEWSPAPER ADVERTISING

Although newspapers have, as a class, become more careful in accepting questionable advertisements much is still to be desired. Most papers would, we trust, decline space to those recognized frauds which concern financial matters but a large proportion of the newspapers continue to accept advertisements of proprietary preparations with outrageous claims for benefits which physicians know to be fraudulent. The average unscientific person does not seem to know that a sequence of events is not evidence in many cases, certainly not in the personal sensations and deductions of a sick person. Testimonials of alleged cures are valuable assets for the venders of drugs and lead many people to spend money. This is not the worst feature of this detestable business for although we may want to modify the quotation that "he who steals my purse steals trash" we know that oftentimes the duplicity of the patent medicine manufacturer and his coadjutor, the newspaper, induce sick persons to throw away chances of recovery in addition to the loss of money.

Some newspapers are high minded enough to depart from this all too common custom and it

is a pleasure to record that the *Fort Wayne News Sentinel* and the *Indianapolis News* are attacking this problem vigorously. We have been surprised that our papers in the East are so generally associated with those manufacturers who traffic in the health of human beings.

We feel that if medical societies would take a definite stand, pass suitable resolutions and have them presented to the owners of newspapers by a committee composed of eminent men, some changes would be brought about. We have faith in the intelligence and public spirit of many of our newspaper editors and believe that they are ignorant of the harm done rather than that the appeal of the dollar is the highest consideration.

THIS WEEK'S ISSUE

Contains Articles by the Following Writers:

WHITE, PAUL D. "The Use of Drugs in Heart Disease." Dr. White is instructor of Medicine and a graduate of Harvard Medical School. He is Associate of Medicine at the Massachusetts General Hospital and Chief of the Cardiac Clinic.

JACKSON, HENRY. "The New England Heart Association." Harvard M. D. For many years Visiting Physician to the Boston City Hospital.

WORCESTER, ALFRED. "Nursing Problems." Ex-President of the Massachusetts Medical Society. He had a large influence in developing the Waltham Hospital and Training School for Nurses and now holds the position of Henry K. Oliver Professor of Hygiene, Harvard University.

MUDD, S. G. & MEANS, J. H. "Clinical Spirography. 1 Pulmonary Response to Work in Normal, Obese, Cardiac and Anemic Persons." Dr. Means is a graduate of Harvard Medical School and holds the position of Jackson Professor of Clinical Medicine in the same institution and is chief of the Medical Service at the Massachusetts General Hospital. Dr. Mudd is also a graduate of the Harvard Medical School and is a House Officer of the Massachusetts General Hospital.

CHEEVER, AUSTIN W., who submits the report "Progress in Syphilis," is a graduate of the Harvard Medical School and devotes himself to pediatrics and internal medicine.

The Massachusetts Medical Society

MEMBERSHIP CHANGES

Dr. Leo V. Friedman has moved his office in Boston to 15 Bay State Rd.

Dr. James C. Janney announces the removal of his office to 252 Marlboro St., Boston.

Dr. Curtis C. Tripp of New Bedford has moved from 10 to 15 Eighth St.

Dr. Charles S. Burwell, Jr., has moved from Oil City, Pa., to Nashville, Tenn., where he is at the Medical School of Vanderbilt University.

Dr. V. F. H. Laub-Gross has moved from Brooklyn to New York City, where his address is 818 West 179th St.

The Massachusetts Medical Society

SECTION OF OBSTETRICS AND GYNECOLOGY

CHARLES E. MONGAN, M. D., *Chairman*
FREDERICK C. IRVING, M. D., *Secretary*
THOS. R. GOETHALS, M. D., *Clerk*

Boston Lying-In Hospital, Boston, Mass.

(Communications and questions addressed to the Clerk will be gladly received and cheerfully answered.)

INDICATIONS and contraindications for the operation of abdominal Cesarean section form a very essential part of the obstetric teaching of medical students. Emphasis cannot be laid too strongly upon the fact that in many, if not in most, of the cases in which the first Cesarean is performed it is done on relative rather than absolute indications. In other words the operation is an elective one, inasmuch as in these cases it would be possible, although not necessarily advisable, to deliver the patient by the pelvic route.

The fact that too many elective Cesareans are being done is beyond question; and it is to this problem that the Section wishes to add a word in the present column. Illustrative of it is the fact that an obstetric consultant to a community hospital has reported that a case was recently referred to that institution in charge of one of the courtesy staff; this case, in the opinion of her physician, required a Cesarean for delivery. The rules of the hospital staff, however, demanded that Cesarean should be done only after consultation with the regular staff obstetrician or under equally competent advice. Such consultation was waived by the patient's physician, and delivery was promptly carried out by means of forceps.

The physician who does obstetrics should realize the danger incurred by the patient who is delivered by Cesarean. No one would question the advisability or necessity of the operation when a real disproportion exists between the baby and the maternal pelvis. Generally speaking the patient who has had one Cesarean should be delivered in future pregnancies by the same method. It is, however, in the elective cases and in those in which an absolute indication has been overlooked or neglected that the mortality of patients following Cesarean section moves upward by leaps and bounds. Let us quote some of the figures from a survey of Cesarean section performed in Great Bri-

tain and Ireland from 1911 to 1920 inclusive compiled and published in 1922 by Holland:

No. of cases	When operated on	Indication	Mortality
1202	Before onset of labor	Contracted pelvis	1.6%
398	Early in labor	" "	1.8%
	Late in labor	" "	10.0%
35	After attempted induction	" "	14.0%
101	After attempted forceps delivery	" "	25.0%
6	After attempted craniotomy	" "	50.0%
195		Eclampsia	32.0%
139		Placenta previa	11.5%
66		Accidental hemorrhage	27.0%

The cases tabulated by Holland show the lowest mortality where the disproportion has been recognized before the onset of labor or early in labor. His figures show graphically how the risk to the patient increases with long continued labor, attempted induction, and attempts at delivery from below. If physicians would convince themselves how immeasurably these factors, as also long standing rupture of the membranes and repeated vaginal examinations, jeopardize the chances of a Cesarean patient for recovery it is safe to say that many unnecessary operations of this type would be avoided. Actual uterine infection, if present, affords an absolute contraindication to Cesarean unless the uterus is removed at the time of operation.

The physiican who considers elective Cesarean for his patient should ponder these questions in minute detail before advising this method of delivery. That the operation is technically an easy one for the physician trained in abdominal surgery there can be no doubt; but the ability to perform it does not imply proper judgment regarding the fitness of the patient for it. The mere ease and time saving of the operation should not blind us to its very real dangers.

MISCELLANY

CHALLENGE TO ANTI-VACCINATIONISTS

Dr. Robert Lyster's recent challenge was nothing new. It was much the same as that issued by Sir William Osler, and like his was not accepted. "Some time ago," said Osler, "I was twitted by the editor of the *Journal of the British Vaccination League* for my curious silence on this subject. I would like to issue a Mount Carmel-like challenge to any ten unvaccinated priests of Baal. I will go into the next severe epidemic with ten selected vaccinated persons and ten selected unvaccinated persons: I should prefer to choose for the latter three members of Parliament, three anti-vaccination doctors—if they could be found—and four anti-vaccination propagandists. And I make this promise: neither to jeer nor gibe when they catch the disease, but to look after them as brothers. And for the four or five who are certain to die, I will try to arrange funerals with all the pomp and ceremony of an anti-vaccination demonstration."

HOPES TO CHECK DIPHTHERIA AND DEAL WITH OTHER PROBLEMS IN BOSTON

Dr. Ceconi has entered upon an active campaign for the application of toxin-anti-toxin among the Boston school children with the expectation of diminishing the number of cases of diphtheria.

Dr. Ceconi feels very confident that if parents will coöperate diphtheria will be practically eliminated from the school children of Boston.

In the beginning of this campaign the use of toxin-anti-toxin will be limited to the first grades and will only be applied after consent of the parents has been given.

In speaking of tuberculosis, the doctor says that there are probably between 500 and 600 cases of unrecognized tuberculosis among the Boston school children at the present time. This situation will be given attention.

In coöperation with the State Department of Public Health in its 10-year program it is expected that the majority of these cases will be discovered and proper treatment instituted. There will be an effort to secure universal vaccination among the school children of greater Boston, and it is hoped that the cordial coöperation of parents will be forthcoming in this as well as the other health movements.

A STUDY OF CARBONATED BEVERAGES

Bottled carbonated beverages, because of their carbon dioxide content, are purer than the average drinking water and the safest of beverages from a bacteriological viewpoint, declares Charles E. McKelvey, of the A. B. C. B. Research Fellowship staff at Iowa State College. This information, which is of particular interest at this tme when the consumption of water and beverages is at peak, is given in a report just made by Mr. McKelvey who is one of a group of scientists working under an endowment made by the bottlers' national trade association, the American Bottlers of Carbonated Beverages.

Mr. McKelvey's report, which is entitled "The Effect of Carbon Dioxide Under Pressure Upon Various Pathogenic and Non-Pathogenic Bacteria," presents the results of a year's work during which he made approximately 500 ana-

lyses of bottled carbonated beverages and the raw materials entering into their manufacture and an exhaustive review of more than thirty authorities on the subject. He summarizes his findings as follows:

1. Carbon Dioxide has a distinct germicidal effect upon bacteria, the magnitude increasing with the pressure of the gas.
2. The effect upon different bacteria varies greatly, the pathogenic forms being killed most easily, and the spore formers resisting most.
3. Despite its evident effect as a germicide, the use of carbon dioxide should be preceded by all possible sanitary precautions.

Allen, and his co-workers, seem to be about the first in the United States to make any comprehensive survey of the beverage industry as regards sanitation. In their work they first reviewed previous studies of the problems by many authors, a bibliography of which is included at the end of this paper. From this, and the work done by them, these authors state:

1. That carbonation greatly diminishes the number of bacteria in water and other ingredients, and from unclean bottles.
2. That carbonation is not in itself sufficient protection against contaminated water and insanitary methods.

Mackenzie is quoted by Gates as having made the statement that a 22 percent volume of carbon dioxide in Ringer Locke solution caused the death of the meningococcus organism in 20 minutes. Larson, Hartzell and Diehl state the typhoid, coli, tuberculosis, pyocyaneus, staphlococcus, streptococcus, and pneumococcus organisms are killed by a pressure of 50 atmospheres of carbon dioxide for one and one-half to two and one-half hours. Under 40 atmospheres no effects were observed, and yeasts remained uninjured after 48 hours.

Koser and Skinner, in an article upon the viability of the colon typhoid group in carbonated water and carbonated beverages, report the results of counts made upon carbonated and uncarbonated bottles of water which had been inoculated with the organism. For water inoculated with coli and held at 20-21 degrees Centigrade, the controls in 7 days diminished from a count of approximately 260,000 to a count of 10,000, while those carbonated at 41 pounds (18 degrees C.) were found to be practically sterile in 7 days. A similar set held at 1 degree C. showed a decrease in the controls of from 200,000 to 17,000 in 26 days, and the carbonated sample was practically sterile in that time. The Hydrogen Ion concentration of the carbonated samples was found to be 4.0-4.4.

Almost identical results were obtained with a pressure of 28 pounds and with atmospheric pressure (the carbon dioxide in excess of saturation at atmospheric pressure being allowed to escape just before inoculation). Thus it was assumed that the germicidal effect was due to the saturated solution of carbon dioxide and that the added pressure was not very effective.

A comparison was next made between acid and non-acid beverages. A vanilla was chosen for the non-acid and a lemon for the acid drink. It happened that under the conditions of the experiment the vanilla received a little more carbon dioxide than the lemon, but the total acidity, due to the presence of the citric acid, was much higher in the lemon. The latter became sterile in four days and the vanilla in fourteen, when both were kept at 21-22 degrees Centigrade. At 1 degree the lemon had become sterile in one month, while after two months the vanilla gave positive tests for the organism. To determine the effect of the acid in a beverage a lemon was bottled without acid, the results obtained being on the same order as with the vanilla. They experimented with other beverages containing the same and more acid and it became evident that the rate of decrease of the coli was proportional to the amount of the acid present. Results were almost the same when the carbon dioxide was omitted, illustrating that in reality the effect of the citric acid over-shadowed the effect of the carbon dioxide.

Tests were also run with typhoid and paratyphoid organisms and the typhoid was reduced in count from 45,000 to negative in 48 hours, with 25 pounds pressure, at 22-24 degrees. At one degree C. the count dropped from 44,000 to negative in seven days. The para organism was found to be more resistant. In acid containing beverages typhoid dropped from 27,000 to negative in 2 hours! Spore forming organisms, that is the spores themselves, resisted for many months the effects of the gas, spores of B. mesentericus surviving an acid concentration of citric acid (Ph 3.0) for a month with little decrease.

These authors summarize as follows:

1. Carbon dioxide exerts a very harmful effect upon the colon typhoid group, and the period of viability in carbonated water is much shorter than in the same water uncarbonated.
2. The life is shorter in acid beverages than in non-acid beverages.
3. Typhoid and paratyphoid are more easily killed than coli.
4. Spore formers are quite resistant to the effects of carbon dioxide.

In the past year the writer has made in the neighborhood of 500 analyses of bottled carbonated beverages and the raw materials entering into their manufacture, and some very interesting observations have been made in regard to this very phenomenon. In very many instances samples of plain and carbonated water, from the same original source of supply, have been

sent in for analyses to the Research Fellowship of The American Bottlers of Carbonated Beverages at the Iowa State College in Ames. When the samples are not sent according to directions (they should be collected in a sterile wide-mouth bottle and send *iced*) the analysis is not trustworthy, that is it does not give the original count. However, by way of comparison, the counts of the two samples are interesting. The following table, taken from our records, indicates the marked effect that the carbonation has had on the bacteria which were present in the water or in the bottles in which the samples were sent.—(considering effect of carbonation and time alone)

Waters known to have come from the same source of supply

Uncarbonated	Carbonated
500,000	33,000
100,000	0
60,000	9
50,000	0
33,000	7
30,000	170
5,000	0
4,300	0
1,000	0
700	3
429	0
128	7
110	0

It is also well known that spoilage due to bacteria in carbonated beverages is much less frequent than in uncarbonated beverages, or the so-called "still drinks."

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RECENT DEATH

BRYANT—Dr. Lewis Lincoln Bryant died at his home in Cambridge, July 6, 1925, at the age of 75. He was a graduate of Harvard Medical School in the class of 1874, joined the State medical society in that year, and had resided in Cambridge all his life. His name was placed on the retired list in 1920.

OBITUARY

JOHN H. GLEASON, M.D.

Dr. John H. Gleason of Manchester, N. H., one of the best known and most skilled surgeons in New England, died at his home, 2241 Elm street, June 29th, after a brief but severe illness. He was fifty-five years old. Dr. Gleason, as a surgeon and as a man represented the best. By his own efforts and by his own resources he rose to the top of his profession. His ability was well recognized by his associates and his skill was widely sought. In his professional work he sacrificed everything including his own personal health and comfort to the welfare of his patients by whom he was much beloved and respected.

In community life he was active in the support of every good cause and he had become a very powerful and influential citizen in civic life occupying many places of trust and responsibility.

Among the medical organizations to which he belonged are, The British Medical Association, The American Medical Association, The American College of Surgeons, New Hampshire Medical Society of which he was vice president, The New Hampshire Surgical Club, Hillsborough County Medical Society, Manchester Medical Society and The Sphinx Club of Manchester. He was the senior Consulting Surgeon of the Hillsborough General Hospital and Surgeon Chief of the Beacon Hill Hospital. In social and civic life he was prominent in the Manchester Rotary, Manchester Country Club, Derryfield Club, National Scientific Society, New England McGill Grad-

uate Society. He was a member of the Franklin Street Congregational Church. His burial was in Pine Grove Cemetery, Manchester, N. H. He is survived by his widow, Mrs. Ethel E. Gleason, one son, John McArthur, one daughter, Elizabeth Eastman Gleason, his mother, Mrs. Mary V. Gleason, one sister, Sister Mary Joan of the Community of St. John Baptist of New York, and two brothers living in Newport, Vt.

Dr. Gleason was born in Cowansville, P. Q., where he attended the common schools and later graduated from the Academy. He graduated from the McGill University first as a chemist in 1891 and in 1895 he graduated with honors as M.D., C.M. He began the practice of medicine in Manchester, June 1896, serving on the Staffs of the Sacred Heart, Elliot and Notre Dame hospitals from time to time.

In the death of Dr. Gleason the state of New Hampshire and the city of Manchester, N. H., has lost a citizen whose place it will be hard to fill. He has given a life time of service to his community both as a physician and as a public spirited man whose one desire was to be useful to the people with whom he lived.

CORRESPONDENCE

AMERICAN MEDICAL ASSOCIATION

COUNCIL ON PHARMACY AND CHEMISTRY

Editor, Boston Medical and Surgical Journal:

In addition to the articles enumerated in our letter of June 30, 1925, the following have been accepted:

Eli Lilly & Co.—

Diphtheria Toxin-Antitoxin Mixture 0.1L plus.
Typhoid Mixed Vaccine, Prophylactic and Therapeutic.
Schick Test, 50 test package.

H. A. Metz Laboratories—

Neosalvarsan Dose X11.

Parke, Davis & Co.—

Germicidal Discs of Potassio-Mercuric Iodide—P., D. & Co.

Powers-Weightman-Rosengarten Co.—

Bismosol.
Bismosol Ampules 1 c.c.

Yours truly,
W. A. PUCKNER, *Secretary*,
Council on Pharmacy and Chemistry, A. M. A.

CONNECTICUT WEEKLY MORBIDITY REPORT

FOR THE WEEK ENDING JULY 25, 1925

Diphtheria	17	German measles	1
Last week	25	Malaria	2
Diphtheria bacilli carriers	3	Mumps	4
Typhoid fever	4	Pneumonia (broncho)	4
Last week	4	Pneumonia (lobar)	9
Scarlet fever	14	Poliomyelitis	4
Last week	21	Tetanus	2
Whooping cough	75	Tuberculosis (pulmonary)	28
Last week	106	Tuberculosis (other forms)	4
Measles	60	Gonorrhea	22
Last week	58	Syphilis	20
Chickenpox	8		

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

DISEASES REPORTED FOR THE WEEK ENDING AUGUST 1, 1925

Anterior poliomyelitis	3	Ophthalmia neonatorum	22
Chickenpox	18	Pellagra	1
Diphtheria	47	Pneumonia, lobar	27
Dog-bite requiring anti-rabic treatment	5	Scarlet fever	43
		Septic sore throat	1
		Syphilis	28
Encephalitis lethargica	5	Suppurative conjunctivitis	7
Epidemic cerebrospinal meningitis	2	Tetanus	2
		Trachoma	2
German measles	12	Tuberculosis, pulmonary	87
Gonorrhea	73		
Hookworm	1	Tuberculosis, other forms	18
Influenza	2		
Measles	112	Typhoid fever	18
Mumps	8	Whooping cough	160

NEWS ITEMS

THE APPOINTMENT OF DR. CHARLES E. PRIOR—In order to meet a technical difficulty, Dr. Charles E. Prior was nominated by the Governor to be a member of the Board of Registration in Medicine, and this nomination was confirmed by the Council August 5, 1925.

EDWIN D. REYNOLDS, M.D., is associated with S. Chase Tucker, M.D., 95 Main Street, Peabody, Mass.

DR. BENNETT SOLOMON announces the removal of his office from 1329 North Street to 235 Main Street, Springfield, Mass.

DR. J. S. STONE, President of the Massachusetts Medical Society, is spending a month in the West.

NOTICE

UNITED STATES PUBLIC HEALTH SERVICE

FREQUENT inquiries are received at the office of the Surgeon General, asking if the "National Health Service" located in Washington, D. C., has any connection with the Public Health Service or with the Government of the United States.

On numerous occasions, letters evidently intended for the "National Health Service" have been addressed to the Public Health Service and it was clear that the writers believed the "National Health Service" to be a branch of the Federal Government.

Surgeon General H. S. Cumming desires to announce that the "National Health Service" which advertises, and sells a "Health Book," has no connection whatever with the Public Health Service, and insofar as can be learned, with no branch of the Government

It should be definitely understood that the Public Health Service does not endorse this self-styled "National Health Service" or its books.

This announcement seems necessary in fairness to the general public.

REPORTS AND NOTICES OF MEETINGS*

ALL legally licensed physicians are cordially invited to attend the 35th Annual Meeting of the American Electrotherapeutic Association to be held at the Hotel Drake, Chicago, September 15-18, 1925.

*Notices of meetings must reach the JOURNAL office on the Friday preceding the date of issue in which they are to appear.

SOCIETY MEETINGS

NEW ENGLAND STATE MEDICAL SOCIETIES

The annual meetings of the New England State Medical Societies are scheduled as follows:
Vermont State Medical Society—St. Johnsbury, Oct. 15-16, 1925.

BOOK REVIEWS

International Clinics. Vol. II. Thirty-fifth Series, June 1925. J. P. Lippincott Company, Philadelphia.

The opening artile of this volume is a diversion from the routine in which H. W. Cattell describes the many portrait medallions of prominent physicians designed by Dr. Tait McKenzie.

The next section consists of three excellent monographs. In the first, I. W. Held gives a thorough *discussion of the present status of affections of the kidney* including anatomy, physiology, pathology, symptomatology and treatment.

Rudolph Matas presents a masterly monograph on the *systemic or cardiovascular effects* of *arteriovenous fistulae* based upon his own experience but including observations of others and a complete bibliography.

The subject of *dysentery: its diagnosis and management through the microscope* is ably presented by the collaboration of Frank G. Haughwout and George R. Callender. In turn they discuss the pathology, differential diagnosis, treatment and management of the post-dysenteric state, and the microscopic evidence of post-dysenteric ulceration of the colon.

The section on diagnosis and treatment is headed by *some notes on new growths of the digestive tract* by Thomas R. Brown, which emphasizes the early diagnosis of cancer and exploratory laparotomy in suspicious cases.

Charles G. Cumston discusses the rather difficult subject of *the symptomatology and diagnosis of cystic neoplasms of the ascending meso-colon.* The variation in symptoms makes preoperative diagnosis difficult.

C. G. H. Baumler uses a few pages for a paper entitled *personal experience fundamental for prognosis in medical practice.*

The question of treating *the patient or his disease* is raised by James J. Walsh. He very ably emphasizes the need of a better understanding of patients from the psychological point of view.

John F. Erdman presents a clinical talk in which he sketches the subject of *abdominal diagnosis.*

James W. Bruce emphasizes the importance of early recognition of *intracranial hemorrhage of the new-born* and the value of lumbar or cisternal puncture.

A brief survey of *the relation of food to health and vitality* is presented by Harvey W. Wiley.

The section on medicine is represented by an excellent clinical lecture on *chronic infectious arthritis* by Lewellys F. Barker in which he illustrates the importance of a thorough study of these cases.

Charles Goodman presents brief case histories of *fibroid of ovary, renal calculi, abdominal cases, splenectomy for thrombocytopenic purpura, gas bacillus, perisympathectomy* and *paralysis agitans.*

The important subject of *abscesses about the anus and rectum* is quite thoroughly discussed by Charles J. Drueck.

J. C. Keeler discusses the subject of *chronic purulent otitis, complicated with chronic mastoid disease.* He believes that most of such cases could be prevented by early proper treatment.

The section on pathology is represented by an able presentation of that interesting though rather obscure subject of *the so-called reticulo-endothelial system: its relation to phagocytosis defense processes; lipoid and protein metabolism, destruction of red cells and to neoplasms.*

Major-General Merritte W. Ireland explains the organization of the *medical department reserve of the United States Army.* He outlines the requirements of various types of hospitals and suggests that the staffs of civilian hospitals form units so as to be readily available without undue inconvenience to their present institutions.

Official History of the Canadian Forces in the Great War, 1914-19. The Medical Services. By SIR ANDREW MACPHAIL, Professor of the History of Medicine, McGill University. 428 pages. Ottawa, F. A. Acland, 1925.

A brief history in narrative form of the part played by the Canadian Army Medical Corps during the War has been admirably written by Sir Andrew Macphail, Professor of the History of Medicine at McGill University. Having access to the official documents and being thoroughly familiar with the unofficial events, the author has given us not only the bare facts of the many controversies and mistakes made in the early days of organization, but has skillfully handled his material so that few will feel the sting of criticism. In his description of the controversy of 1916 which led to the resignation of Osler as consultant to the military hospitals in England, Osler's position is again vindicated. A similar conclusion has been

reached by Cushing in "The Life of Sir William Osler."

Although the early chapters in this splendidly written history are of great general interest, the chapters of most importance to physicians are those dealing with the diseases of the War as they affected the Canadian Army. We find that the incidence of typhoid and dysentery—old war diseases—was very small; about 400 cases of cerebrospinal meningitis were observed with a mortality of over 50%; infectious jaundice was common; trench fever, first described in 1915 by a Canadian doctor, caused a relatively high morbidity; tetanus was rarely seen. In the Canadian Army, as in the other allied forces, influenza was the most prevalent and most fatal infectious disease. In most cases the high mortality was due to a secondary invasion of streptococcus. Few soldiers escape the annoyance of lice and scabies. The number of neuroses was about the same as in the American Army. Over 700 self-inflicted wounds were recorded. In combatting venereal disease, the Canadians considered education as the most important preventive measure. Lectures, instructions, and pamphlets were issued freely. In spite of these prophylactic measures, however, the rate of venereal disease for the Canadian Army over-seas was very high—over 15%.

One ought not to forget the casualties caused by German outrages. Six physicians were drowned on the *Llandovery Castle*, a hospital ship, when she was sunk by submarine; all fourteen nurses on this boat also lost their lives. 'The attack was made with utter savagery even the escaping life-boats were pursued and sunk." Hospitals on land were frequently raided from the air. Sir Andrew describes the scene at Etaples in 1918: "At the moment there were in one hospital alone upwards of a thousand patients, and to make the situation more dreadful, three hundred suffering from fractured femurs, and incapable of movement. Incendiary bombs were dropped; the buildings burst into flames; and by their light the enemy aeroplanes were able to descend close enough to employ machine guns upon those engaged in rescuing the patients." In four raids the casualties were 15 patients killed and 67 wounded; personnel, 54 killed and 94 wounded. Another raid, "began a few minutes after midnight with a flare and bomb. The hospital was struck. The two surgeons, three nurses, four patients and sixteen orderlies were killed."

Various tables and statistics on pay, promotion, honors, etc., add much value to the History. There are no illustrations, although one excellent map is inserted, showing the medical arrangements on a divisional front. A comprehensive index has been compiled with great care.

Few books on the War have been so well written. Sir Andrew, in addition to writing an excellent reference book on the part played by the C. A. M. C. in theWar, has given us a stirring and romantic story—a worthy record of that superb body of physicians who answered the call to duty and did that duty well. Thirty were killed and thirty-one died while serving.

The Morality of Birth Control. By ETTIE A. ROUT. Published by John Lane The Bodley Head Limited, London. 224 pages.

In this argument for birth control, the author discusses the question from various points of view. She takes up the objections which have been raised from time to time, and meets the issue squarely. Woman, she says, is fundamentally chaste; it is contrary to her nature to bear children unless they are begotten by the man she loves. The development of contraceptive measures will aid her in approaching this ideal. It will tend to decrease prostitution and will make unnecessary the very numerous abortions which the author believes now occur annually in Europe and America.

"The Morality of Birth Control" contains hints of sexual freedom which will meet with small approval from the majority; to the relatively few whose thinking upon these subjects is free from coventional prejudices, the author's suggestions do not appear impossible. Her outlook upon the question is broad and logical and her arguments in favor of birth control would be difficult to overthrow.

The Conquest of Cancer. By H. W. S. WRIGHT, M. S., F. R. C. S. With an Introduction by F. G. Crookshank, M. D., F. R. C. P. 82 pages. Price $1.00. Published by E. P. Dutton & Co., New York.

"The Conquest of Cancer" is a plea for early diagnosis. Wright gives statistics to prove that the cases coming for operation soonest after the discovery of first symptoms have the best chance of cure. While this is true in a general way, it is by no means universally so. Certain cases of gastric cancer and cancer of the urinary organs give no symptoms whatever until they are too advanced to be operable.

Another angle of attack, that of removing ir ritation, is also over emphasized. The case of cancer of the lip due to pipe smoking, quoted by the author, is representative of only a small proportion of cases. Wright is distinctly in the wrong when he says, on page 56, that "In cancer of the kidney, the bladder, and the gall-bladder, stones are nearly always present to initiate the irritation."

With his plea for early diagnosis, even when it involves a possibly needless operation, we must all agree, but the problem is far more complex than one would think from reading his rather superficial treatise.